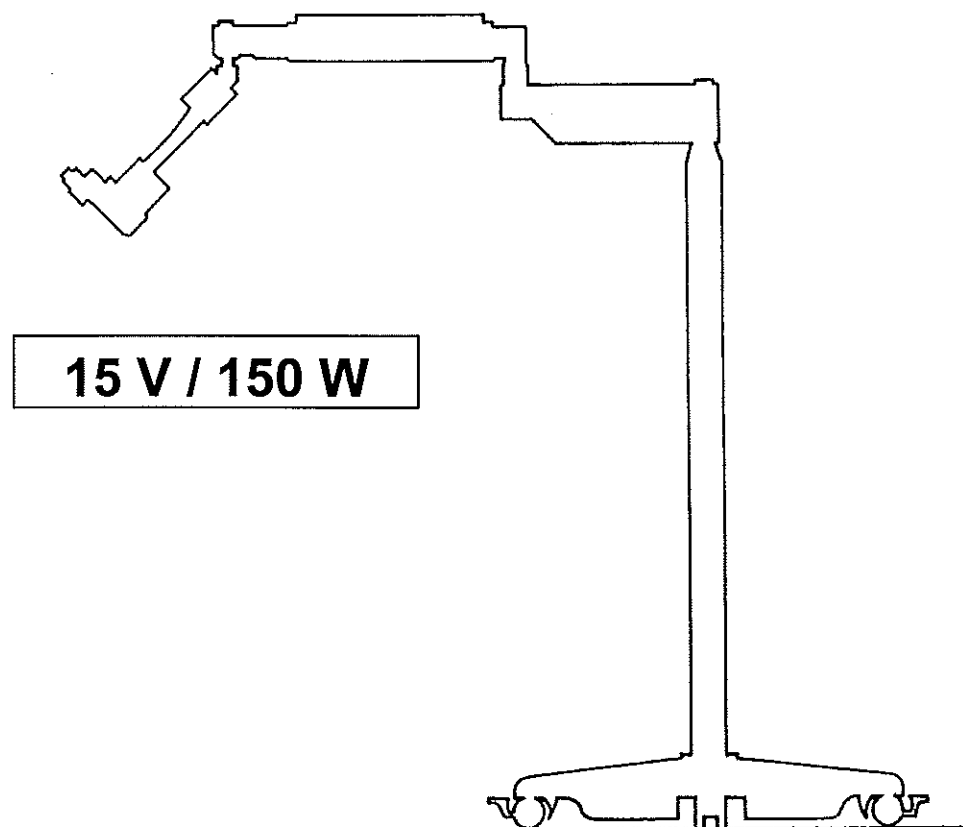


# SOM 62 COLD LIGHT MOTORIZED

Stereo - Operation - and Diagnosis Microscope



**Karl Kaps GmbH & Co. KG**

## MARKS LICENCE

Licence No.:

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☎ 06441 / 80704-0

Fax 06441 / 85985

Postfach 1225, D-35608 Asslar

Europastraße, D-35614 Asslar

[www.kaps-optik.de](http://www.kaps-optik.de)

e-mail: [service@kaps-optik.de](mailto:service@kaps-optik.de)

This microscope is manufactured according to the EU direction 93 / 42 / EWG  
Products of medicine (MPG)

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# User's Manual SOM 62 COLD LIGHT MOTORIZED

## 1.0 SECURITY INDICATIONS, INTENDED USE

- This microscope is manufactured according to the security indications of electrical equipment and complies with the indicated IEC Publications (IEC 601 - 1 / EN 60601 -1 / VDE 0750 part 1). This instrument left KAPS Company in perfect condition.
- To guarantee the normal and safety use of the microscope it is necessary to read this user's manual attentively.
- This microscope is allowed to use in that way only as described in this manual.
- For service and repair only authorized persons are allowed to operate.
- Spare parts and accessories must be admitted by the manufacturer. If there are any questions, please contact our representatives.
- Please substitute burned out fuses by fuses of the same type only (rated voltage, rated current, switch - off characteristics).
- The microscope belongs to safety class I, use mains plug and mains socket both with protective earth conductors only.
- Be sure that inlets and outlets of ventilation system for cooling the housing are open (not covered).
- The microscope is built for use in dry rooms only. Take care that no fluids can enter the microscope components.
- Microscope is protected against overheating. A defect cooling system (fan is defect, inlets or outlets of cooling system are unintentionally covered) will be indicated by blinking of a red light emitting diode (3), Fig. 8, page 11. The protecting system reduces brightness of illumination automatically in that way that a surgeon can finish his activities and microscope will not be damaged. After the user's activities are being finished, cases of disturbances must be eliminated immediately, if this is not possible please advice service department.  
Very important: For identification, service people must know the serial number of the microscope! Please read it from the type label (4), Fig. 8, page 11.
- Intended use  
The SOM 62 COLD LIGHT MOTORIZED is a universal instrument for operative and diagnostic medical use. It is useful for optimal illumination and magnification of the attendance area with the possibility of the manual variation of magnification, focus and image field.  
The use of the SOM 62 COLD LIGHT MOTORIZED is only allowed to authorized people and medical applications as described in this instruction handbook. If this instrument is in intended use, there is no contact between patient and SOM 62.

## 1.1 SECURITY INDICATIONS DURING THE APPLICATION

- Make all works and adjustments at the column before operation, **never** change something over or balance above operation field.
- **Never** change adjustments of the microscope **during** the operation!
- Carry out reconstructions and transportations only when swivel arm is blocked.
- Lamp change: First test that the lamp is cold!

## 1.2 WARNING FOR EYE SURGERY!

- Protect patient through short exposure time and low brightness adjustments, because too intensive light can injure retina.

## 2.0 CONDITION OF MATERIAL AT TIME OF SUPPLY

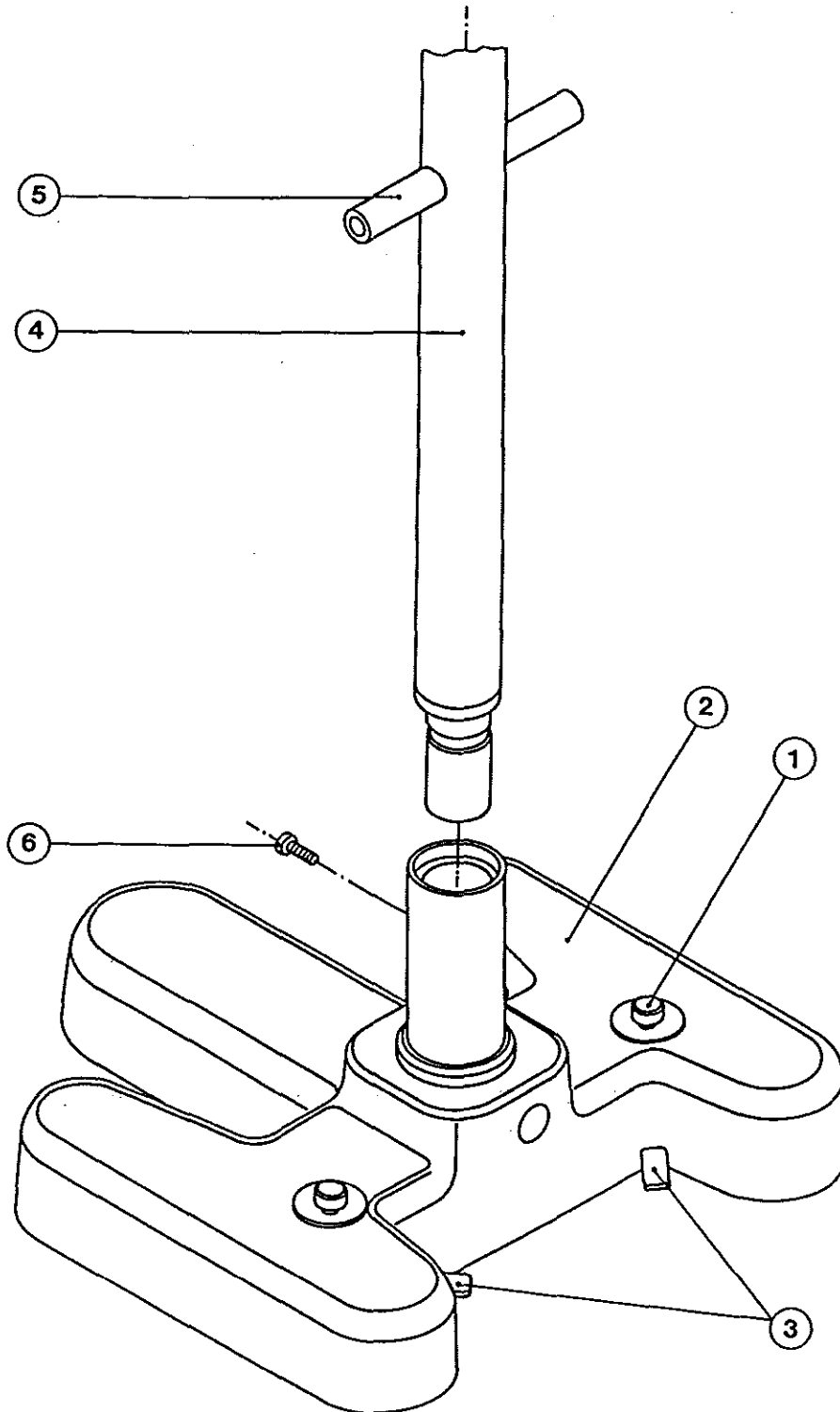
The appliance is delivered in 4 assembled groups:

- Mobile supporting base
- Column
- Swivel arm and suspension arm with electrical power supply
- Microscope head

Fastening aids are enclosed in delivery.

### 3.0 MOUNTING OF ROLLER STAND, H-FORM AND COLUMN (Fig.1)

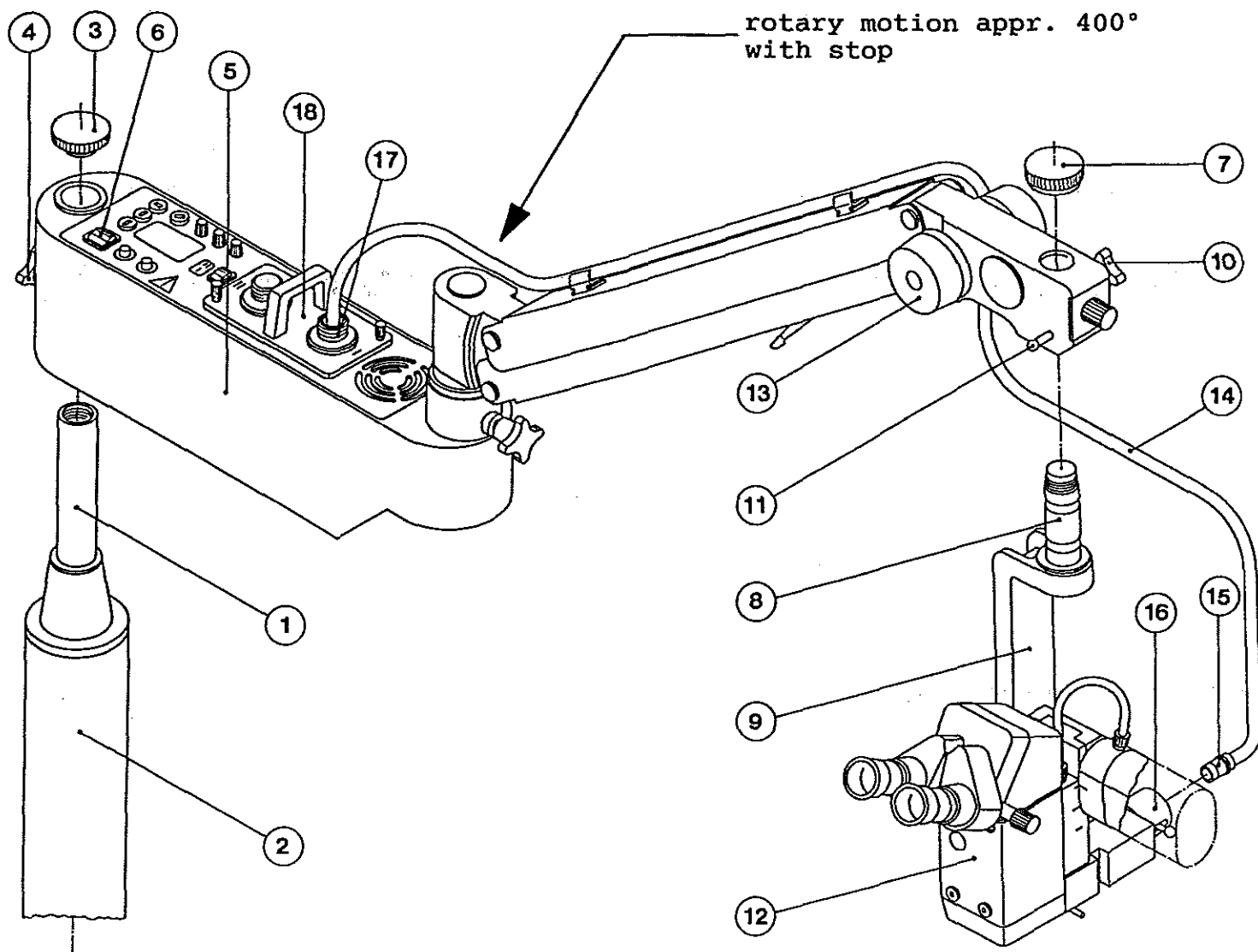
- Locking of roller stand:  
Press both round knobs (1) down on roller stand (2) by foot.  
Loosening is done by both pedals (3).
- Insert column (4) into roller stand. Before fastening straighten handles (5) to roller stand.
- Screw in screw (6). Fasten screw with enclosed hexagon socket wrench until column clamps.



(Fig.1)

**4.0 MOUNTING OF APPLIANCE (Fig.2)**

- Unscrew safety cap (3) from vertical guide cylinder (1) of column (2).
- Take care that clamp, cross handle (4) is open.
- Insert swivel arm (5) (on-/off switch (6) upwards).
- Screw on safety cap (3) again.
- Unscrew safety cap (7) from guide cylinder (8) of microscope carrier (9).
- Take care that clamp, cross handle (10) is open.
- Press locking pin (11) and insert guide cylinder of microscope carrier to its stop. Release locking pin; it locks and thus prevents the drop out of microscope head (12).
- Screw on safety cap (7) by hand on overlying threaded coupling of guide cylinder.
- Control position of counterweights (13), if necessary, put in counterweights to their stop.
- Insert fibre optic light guide (14) with screwed on adapter (15) into cold light adapter (16) at the microscope head to its stop.
- Control position of the other side of fibre optic light guide with mount (17), if necessary, put in fibre optic light guide in lamp insert (18) again to its stop.



(Fig.2)

**4.1 Special indication:**

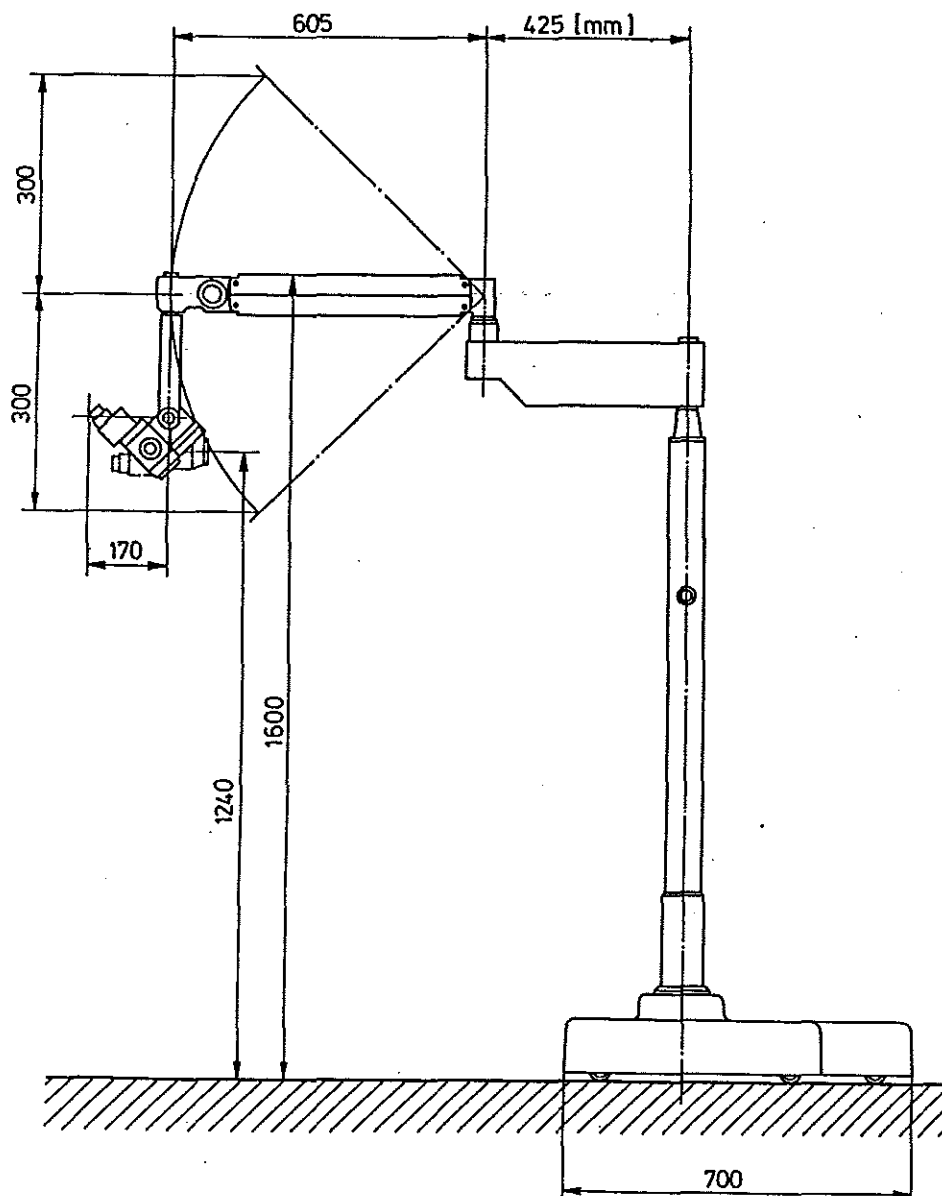
- The joint which connects swivel arm and suspension arm is fit out with a stop to prevent the inner assembled cable.
- The total rotation of suspension arm to the swivel arm is more than whole circuit (appr. 400°).
- By reaching the stop do not rotate further with power to prevent a tear off.

**4.2 ADDITIONAL LOAD**

- The load capacity and tilting stability is balanced with components of our product assortment.
- Please don't attach additional load.

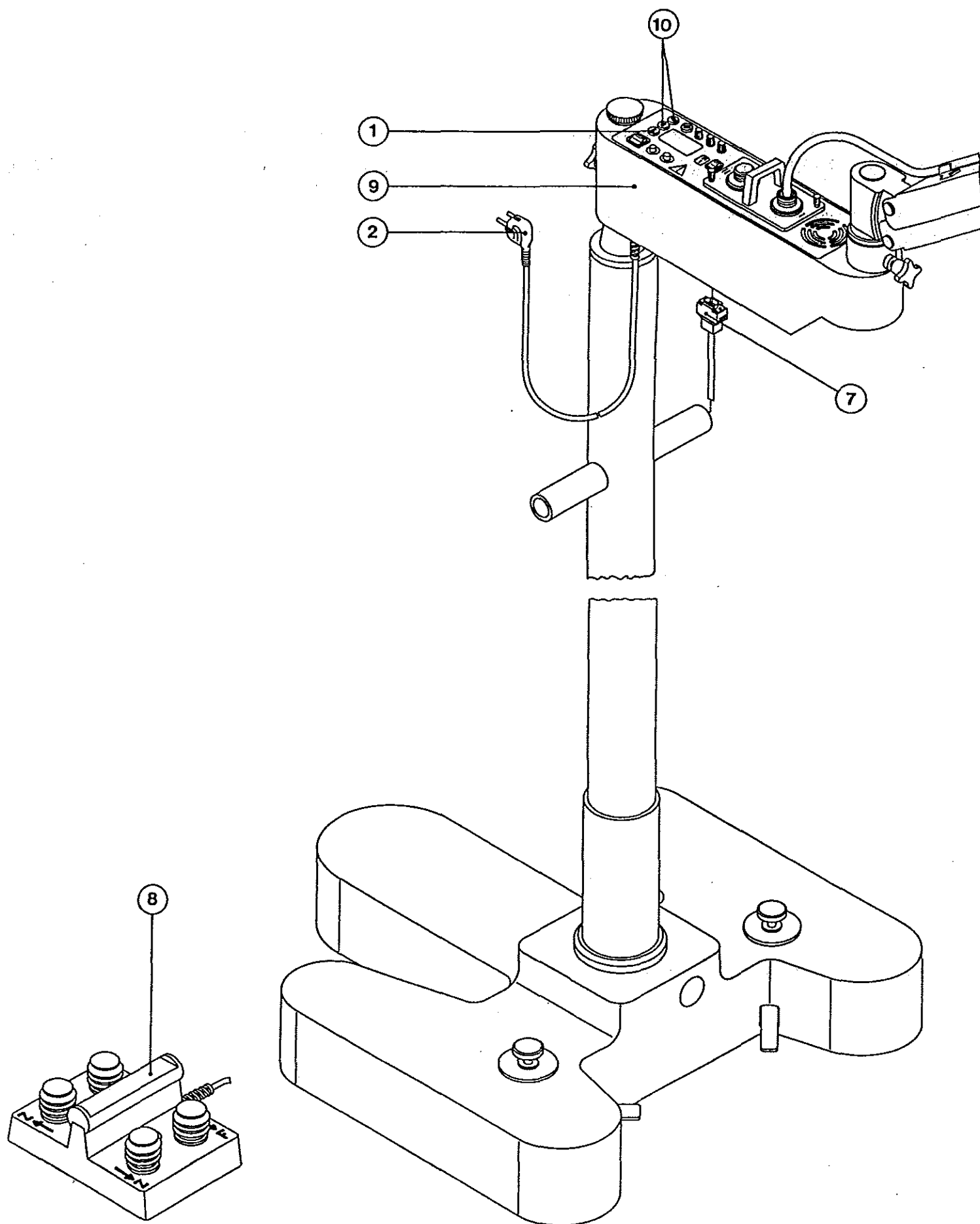
**4.3 MEASURES, WEIGHT (Fig.3)**

Roller stand, H-form	length 700 mm
	width 640 mm
Height of appliance (suspension arm horizontal)	1600 mm
Total weight	appr. 100 kg



(Fig.3)

5.0 CLOSE ELECTRICAL CONNECTIONS (Fig.4) (Fig.5)



(Fig.4)

### 5.1 ADJUSTMENT OF MAINS VOLTAGE

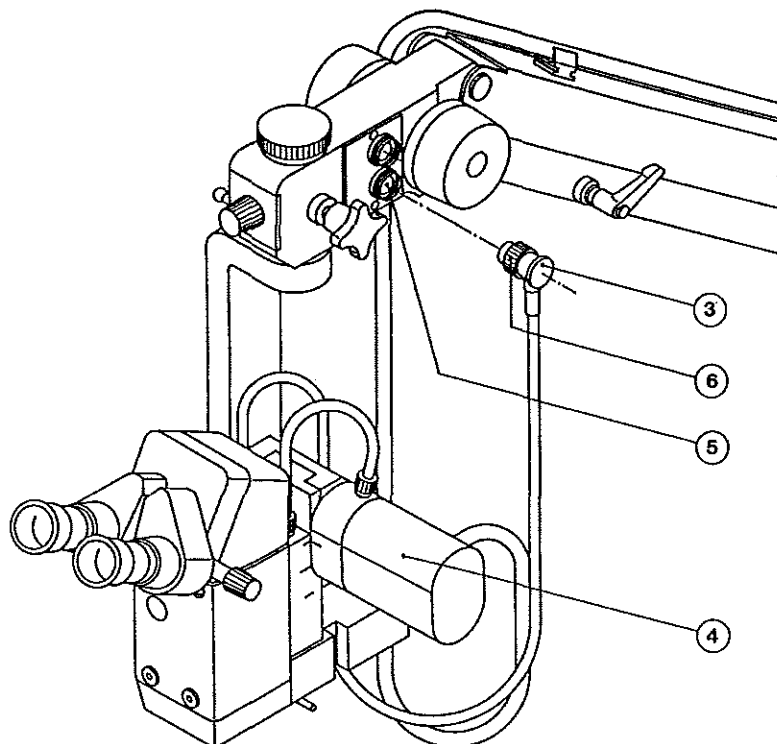
- The appliance is adjusted for 230 V mains voltage at delivery and can be switched over to 115 V if necessary.
- It is only allowed to switch on the appliance, if the mains voltage at place of use is corresponding with voltage indication at voltage selector switch (1).
- Service information:  
If 115 V mains voltage is required, change voltage selector switch (1).  
The mains input fuses T 1 A (2) are automatically correctly dimensioned by special control.

### 5.2 ELECTRICAL CONNECTIONS

- Insert plug (2) in mains socket.
- It is allowed to connect mains plug of the appliance with mains socket both with protective earth conductors only.
- Connect plug (3) from fine focussing unit (4) with plug socket (5). Secure with knurled ring (6). Attention: The nose of the plug must fit to the groove of plug socket.
- Connect plug (7) from foot switch panel (8) with plug socket in the swivel arm (9). Secure with screws.

### 5.3 CHANGING OF FUSE (after removal of the defect)

- Fuses in fuse holder:  
(2) T 1 A (2 mains input fuses for lamp supply during mains voltage 230 V / 115 V)
- Changing of fuse: Draw out plug (2). Insert screw driver into slit of fuse holder (10), screw out to the left. Remove cap and replace fuse placed in it. Insert fuse with cap again, screw in to the right.
- Attention: It is only allowed to change the fuses against fuses of the same type (rated voltage, rated current, switch off characteristics).

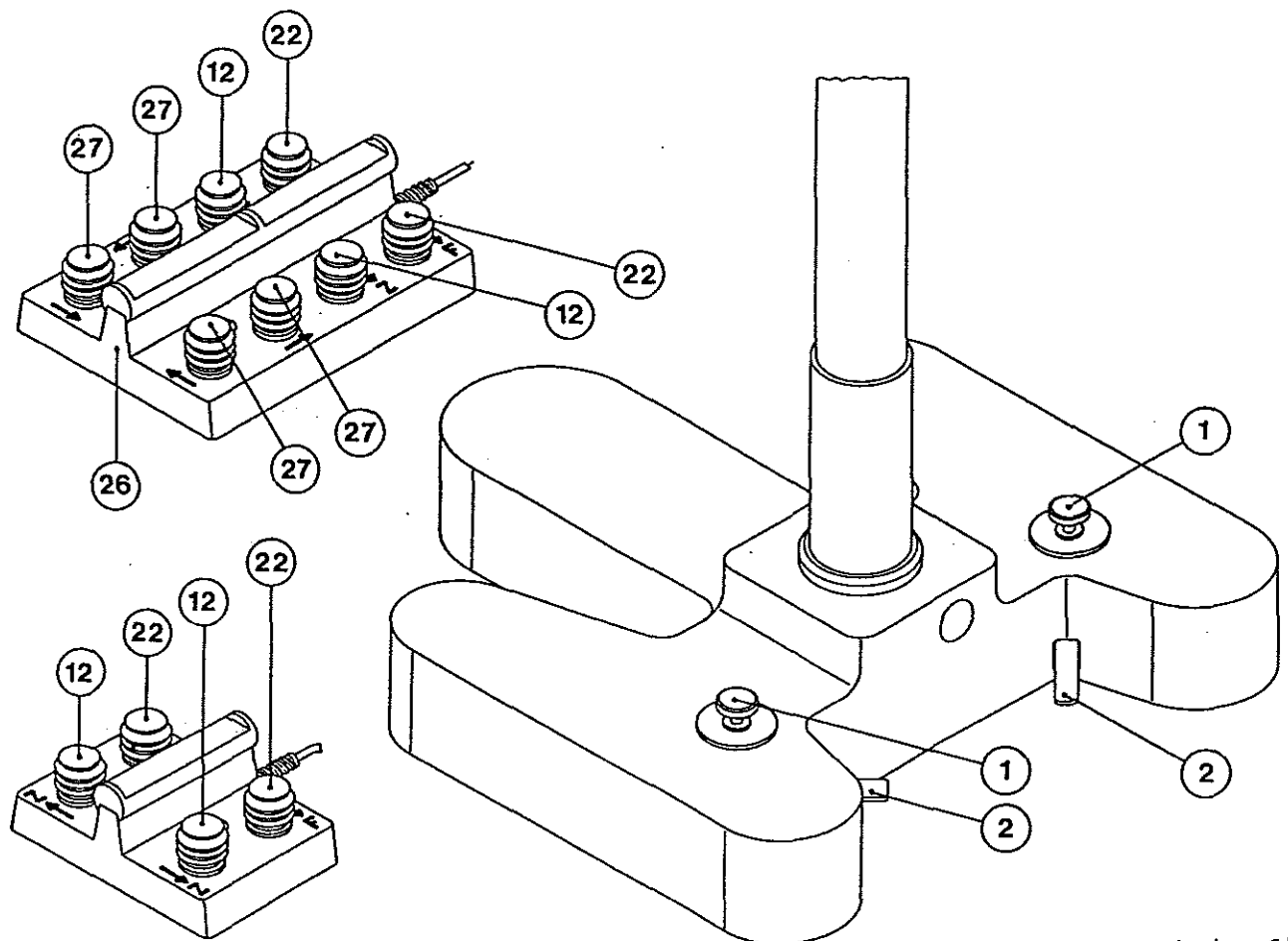


(Fig. 13)



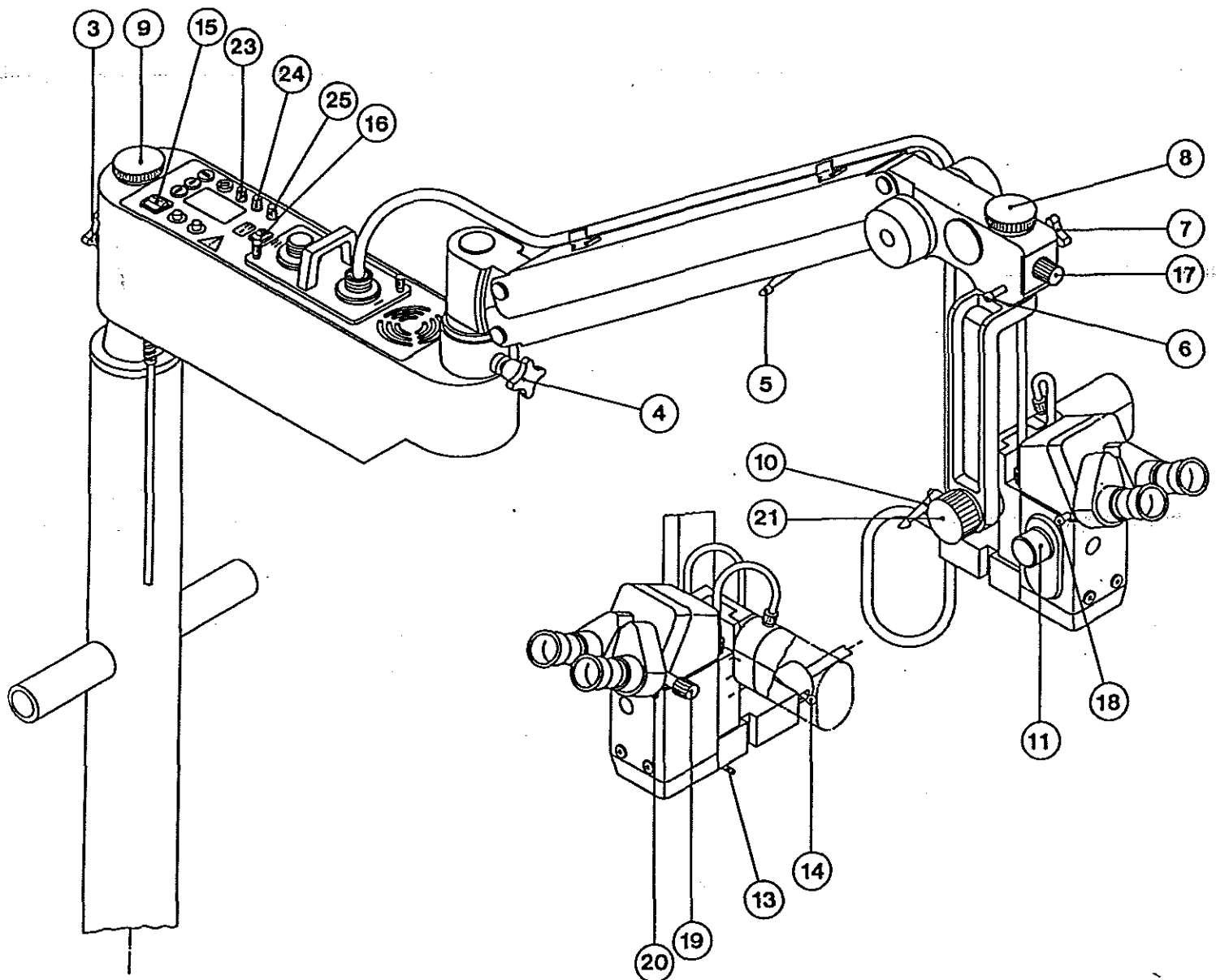
## 6.0 CONTROL ELEMENTS (Fig.6) (Fig.7)

- 5 rollers to move the appliance (not showed)
- 2 brakes to lock the appliance (1)
- 2 pedals to loosen the brakes (2)
- Rotating knob for adjustment of the swivel arm setting (3)
- Rotating knob for adjustment of rotary motion of the suspension arm (4)
- Clamping lever to lock the vertical adjustment of the suspension arm (5)
- Safety knob to prevent the microscope head from dropping out while mounting (6)
- Rotating knob to prevent the microscope head from rotating (7)
- Safety cap to secure the microscope head (8)
- Safety cap to secure the swivel arm (9)
- Clamping lever to lock the inclination of microscope head (10)
- Rotating knob for motorized adjustment of magnification (11)
- Foot-operated switch for motorized adjustment of magnification (12)
- Lever to swivel in the green filter (13) (if ordered)
- Lever for changing the diameter of illuminated field (14)
- On-/off switch (15)
- Change-over switch lamp I/lamp II (16)
- Knob for brightness control (17)
- Safety knob to change the binocular tube (18)
- Knob to adjust the eye distance (19) (on inclinable tube 0-60°, straight or inclined tube 60°)
- Apperture lever to adjust the depth of field (20)
- Rotating knob for manual fine focussing (21)
- Foot-operated switch for motorized fine focussing (22)
- Rotating knob to change the motorized speed of ZOOM (23)
- Rotating knob to change the motorized speed of fine focussing unit (24)



(Fig.6)

- Rotating knob to change the motorized speed of XY-coupling (25) (only if using XY-coupling)
- Foot switch panel (26) (only if using XY-coupling)
- Foot-operated switch for fine adjustment of microscope head in XY-direction (27) (only if using XY-coupling)



(Fig.7)

**7.0 OPERATING INSTRUCTIONS (Fig.8) (Fig.9)****7.1 ON-/OFF SWITCH (Fig.8)**

- On-/off switch (1) is located on the upper side of the swivel arm. After the appliance is switched on, the green light emitting diode (2) indicates when microscope is ready for operating. The xenon lamp burns and the ventilator runs.
- **Attention error indication:**  
Red light emitting diode (3) is blinking, see page 3, 1.0 security indication: temperature limit.  
Inform after-sales service immediately.  
Specify number of appliance, see type label (4).
- To reduce the burning life of lamp not unnecessarily, switch off the appliance if the microscope is not used for longer time.

**7.2 CHANGE-OVER SWITCH LAMP I/LAMP II (Fig.8)**

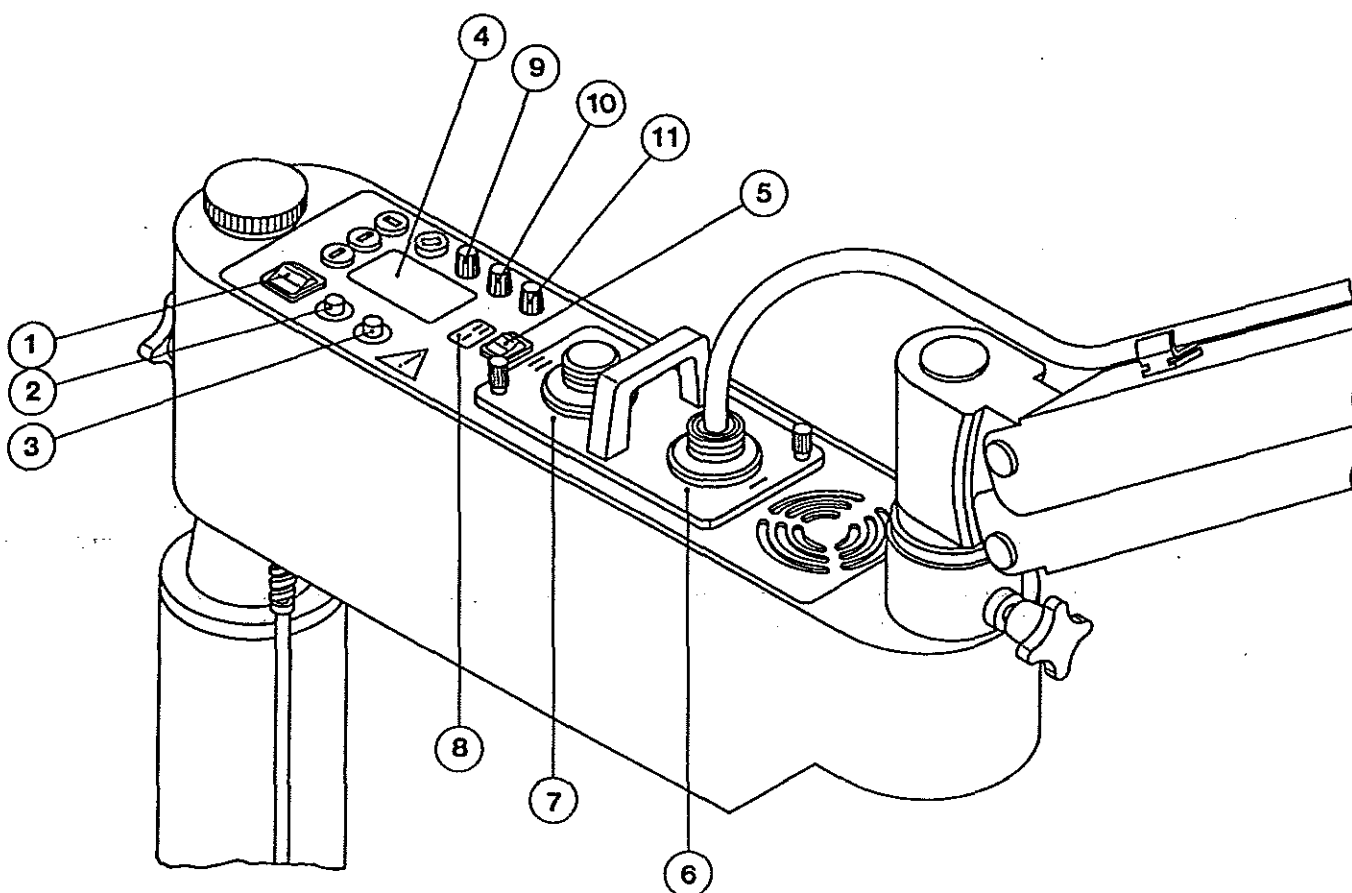
- In case of breakdown of lamp I (6), switch over to spare lamp II (7) by switch (5), see symbol (8).

**7.3 CHANGING THE MOTORIZED SPEEDS (Fig.8)**

- Turn knob (9) for changing the motorized speed of ZOOM.
- Turn knob (10) for changing the motorized speed of fine focussing unit.
- Turn knob (11) for changing the motorized speed of XY-coupling (only if using XY-coupling).

**7.4 BRAKES**

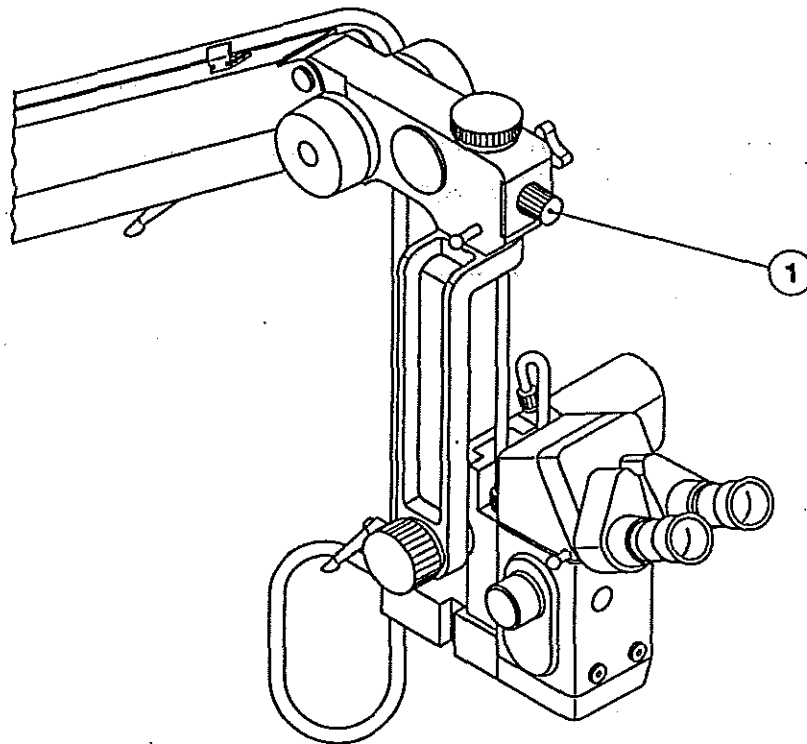
- Adjust all brakes so that proper function of instrument is guaranteed.



(Fig.8)

**7.5 BRIGHTNESS CONTROL (Fig.9)**

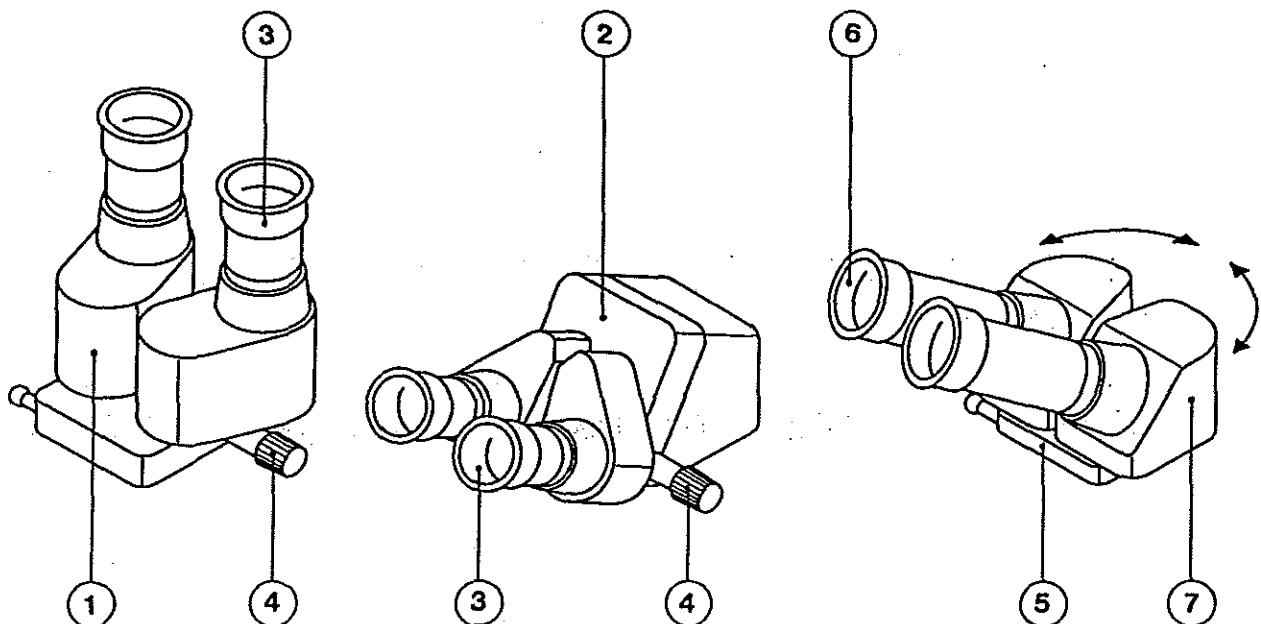
- A change of light intensity is made by rotating knob (1).



(Fig.9)

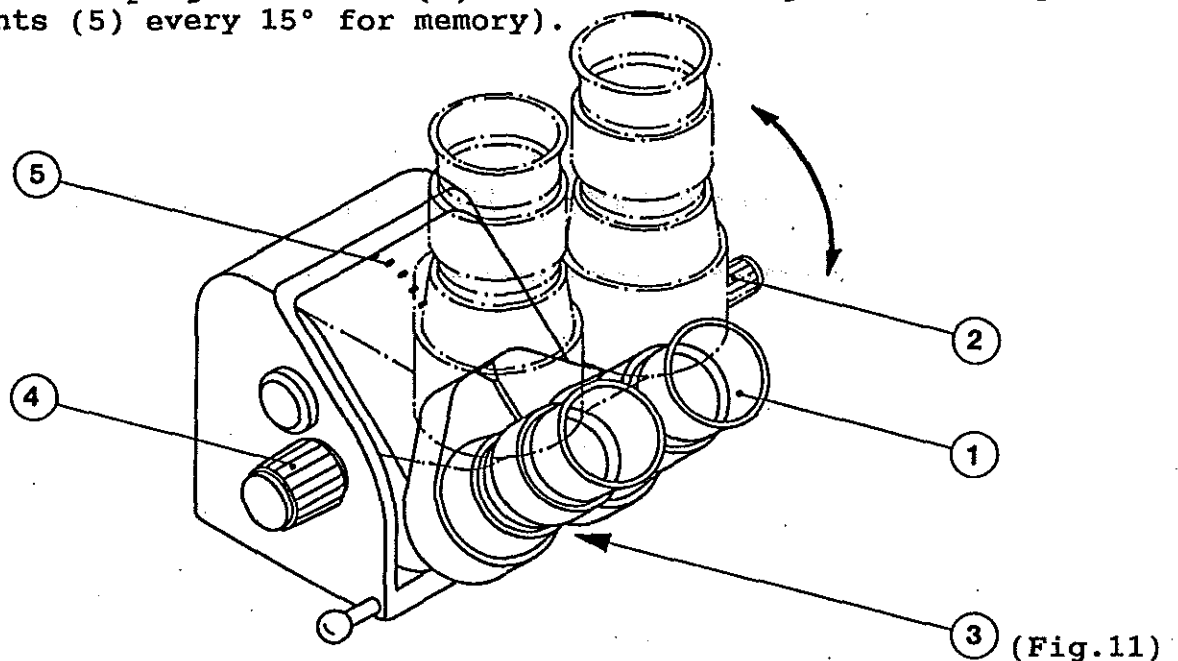
**8.0 INSTRUCTIONS FOR USING THE MICROSCOPE****8.1 ADJUST THE EYE DISTANCE (Fig.10) (Fig.11)**

- MICROSCOPE WITH STRAIGHT OR INCLINED TUBE (Fig.10)  
Turn the microscope in working position.
- Straight tube (1) and inclined tube 60° (2): Bring eyepieces (3) to eye distance by turning lateral knob (4).
- Inclined tube 45° (5): Bring eyepieces (6) by lateral movement of eyepiece tube to eye distance (grip prism housing (7)).



(Fig.10)

- MICROSCOPE WITH INCLINABLE TUBE 0-60° (Fig.11)  
Turn microscope in working position. Bring eyepieces (1) by rotating the knob (2) to eye distance (points (3) for memory).
- Loosen clamping with knob (4). Choose best angle of viewing (points (5) every 15° for memory).



## 8.2 CHANGING THE MAGNIFICATION (Fig.12)

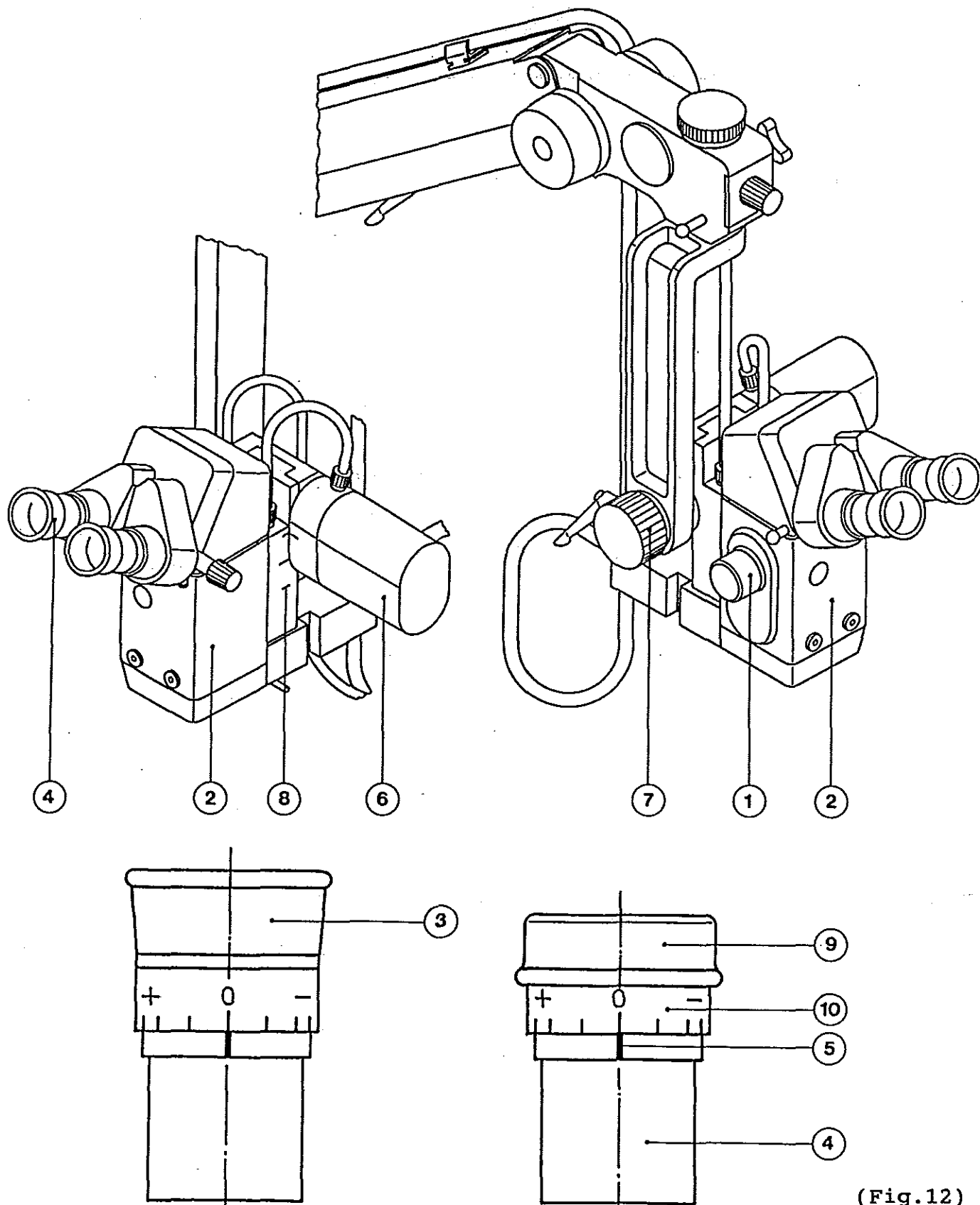
- Adjust the highest magnification with rotating knob (1) of the magnification changer ZOOM motorized (2), respectively with foot-operated switch for motorized adjustment of magnification (see page 9, 6.0 Control elements, (12) Fig.6).
- The magnification will be changed steplessly.

## 8.3 HOW TO FOCUSSE THE OBJECT (Fig.12)

- Before starting the focussing, the fine focussing gear at fine focussing unit (6) has to be brought in medium position. Note the marking points (8) on the right side of the microscope head.
- Adjusting the eyepieces (before focussing):  
Observer normal sighted: eyecup ejected (3).
- Bring "0" (zero) of the diopter scale of the eyepieces (4) to match with the index line (5).
- Adjust the highest magnification at magnification changer ZOOM motorized (2).
- Approach microscope to the object till it is focussed, improve focus by foot switch panel with foot-operated switch (see page 9, 6.0 Control elements, (22) Fig.6) for motorized adjustment of fine focussing unit (6), respectively with rotating knob (7) for manual fine focussing.
- When changing magnification, the image now always will stay well focussed.
- Spectacle wearers, slide back the eyecups (9) of the eyepieces. "0" (zero) stays matched with the index line also. The procedure of focussing the image is the same as described before. After getting a well focussed image, observer maybe makes up his mind to look with bare eyes through the eyepieces (only possible with spherical eye deficiency at infinity). This is very easy realizable: Without changing the distance between microscope and object he can focus the image now by turning the diopter scale of eyepieces, eyecups will be ejected again. With the found position of diopter scale he can also start a new focussing adjustment every time without wearing spectacles.

#### 8.4 EYEPIECES WITH RETICLE (help for fine focussing and when using television or photo systems) (Fig.12)

- Only one of the eyepieces must contain a reticle (magnification must be identical).
- Focus the cross of the reticle by turning the diopterring (10) of the eyepiece, then focus the object with highest magnification (procedure as described before).
- Observe with or without spectacles.



(Fig.12)

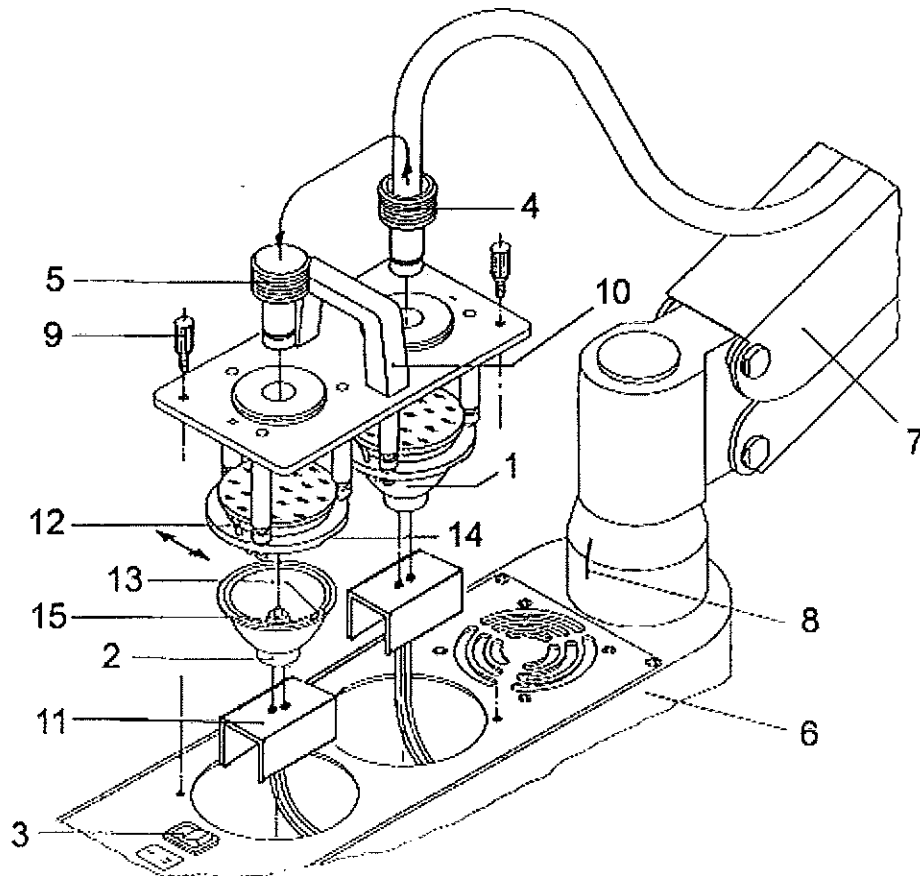
### 9.0 BREAKDOWN OF THE COLD LIGHT ILLUMINATION (Fig.13)

#### 9.1 BREAKDOWN OF THE COLD LIGHT ILLUMINATION DURING OPERATION

- If first xenon reflector lamp (1) is burned out switch over to spare lamp (2) by switch (3).
- Change fibre optic light guide with mount (4) to spare lamp (exchange against plug (5)).
- Attention: Before drawing out and changing fibre optic light guide (4) against plug (5) the swivel arm (6) and the suspension arm (7) must be brought in showed position, note marks (8).

#### 9.2 CHANGING THE XENON REFLECTOR LAMP LATER ON

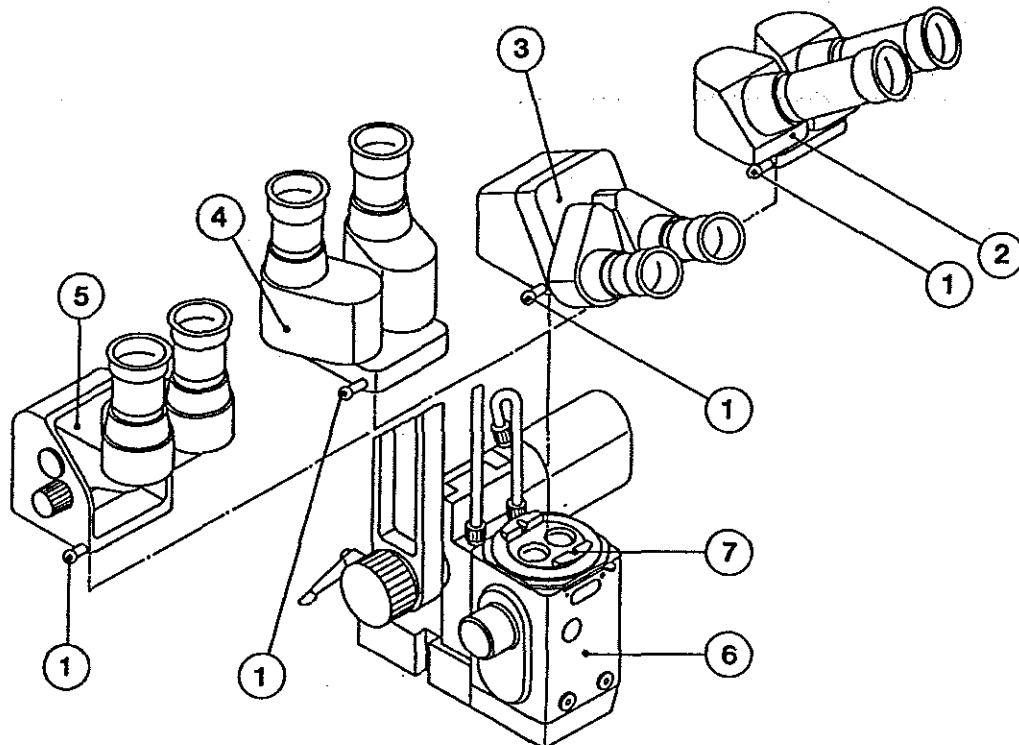
- **Change only lamp of the same type!**
- Switch off appliance and wait until the lamp is cooled down.
- Loosen knurled screw (9), lift lamp insert (10) and pull out u-profile with plug (11), then remove completely lamp insert.
- Push out the defect xenon reflector lamp (1) respectively (2) against resistance of holding spring (12) (in direction of arrow) and replace it.  
Attention: The nose (13) of the lamp must fit to the groove (14) of lamp insert.
- Put in u-profile with plug (11) while gripping bulb (15) of xenon reflector lamp with clean cloth or packing material. Do not hold the lamp at the reflector.
- Integrate u-profile (11) only lengthwise (only lamps with boss), otherwise the ventilation is hampered.
- Tighten lamp insert with knurled screws (9) again.



(Fig. 13)

## 10.0 CHANGING THE BINOCULAR TUBE (Fig.14)

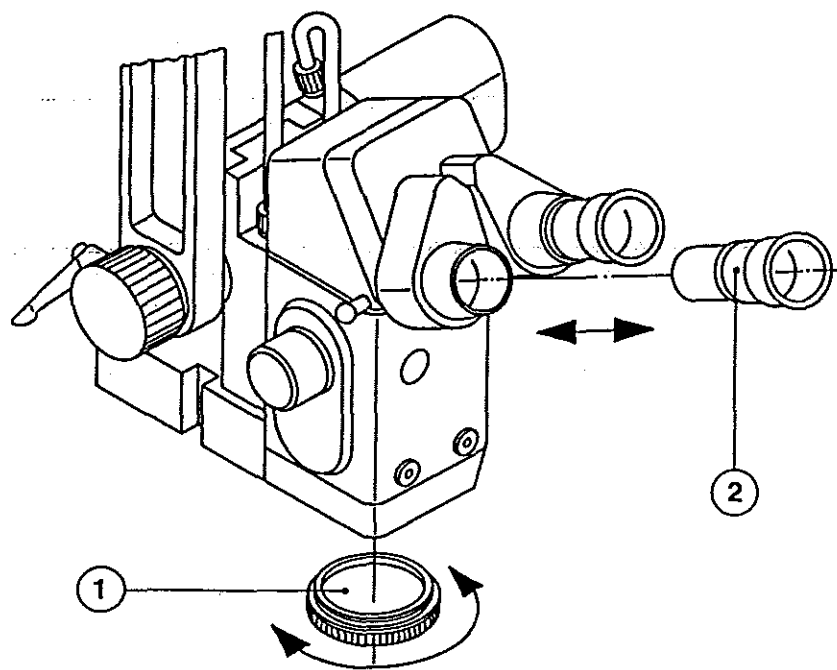
- The change of binocular tubes is made at all versions in the same way.
- Press pin with ball head (1), remove inclined tube 45° (2), inclined tube 60° (3), straight tube (4) or inclinable tube 0-60° (5) of magnification changer ZOOM motorized (6).
- When setting up tube - pin must be pressed down - the two lugs should lock into the nuts (7) of the magnification changer ZOOM motorized. Take care that tube lays plane. Release the pin.



(Fig.14)

## 11.0 CHANGING THE OBJECTIVES/EYEPIECES (Fig.15)

- The objectives (1) have screw bases. Unlock them by turning to the left and lock them by turning to the right.
- Eyepieces (2) are inserted, draw out for changing only.
- Other objectives/eyepieces can be selected by choice. Refer to magnification chart 12.0.



(Fig.15)



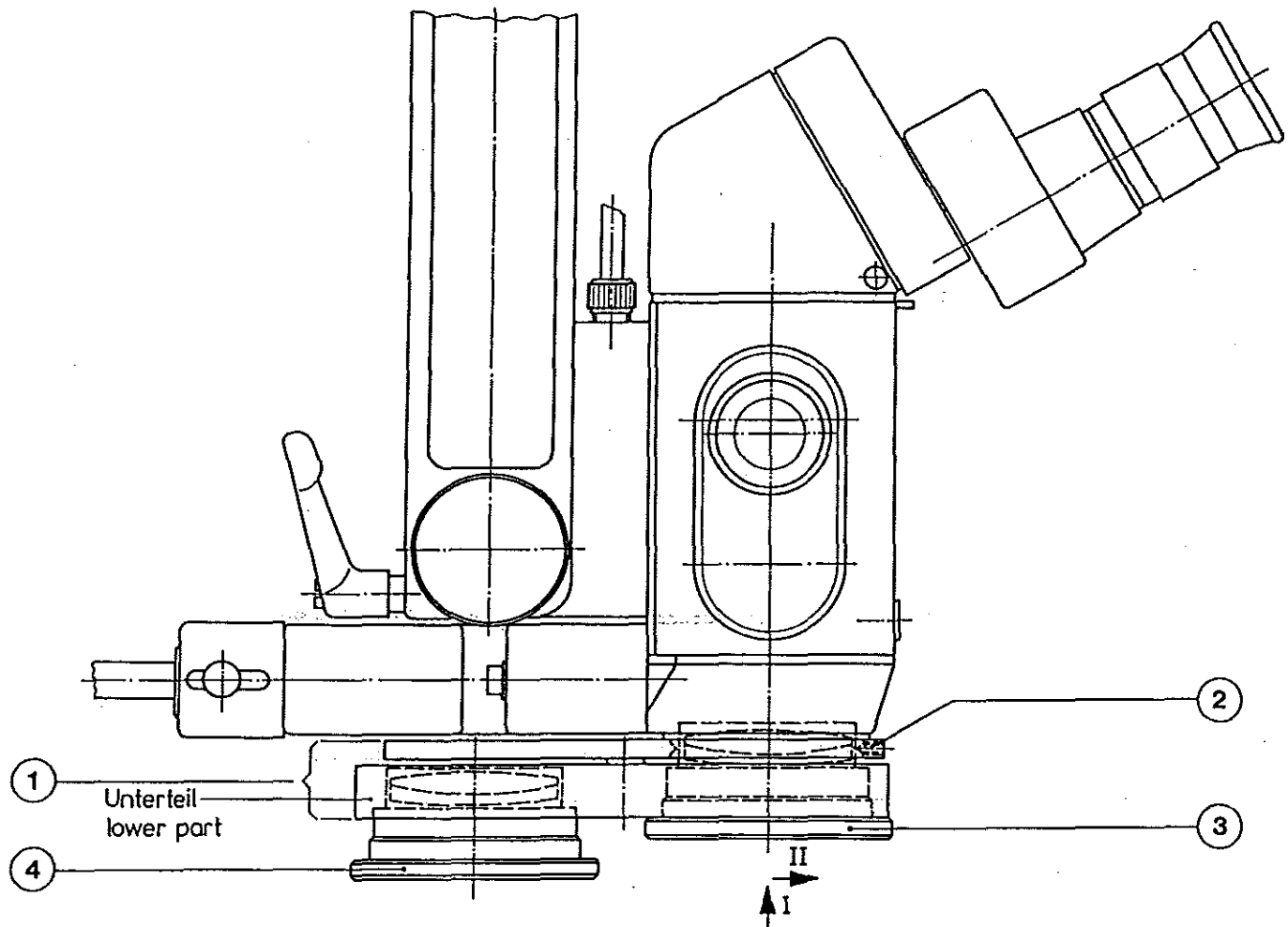
## 12.0 SCHEDULE FOR MICROSCOPE MAGNIFICATION AND OBJECT FIELD MEASURES

SCHEDULE FOR MICROSCOPE MAGNIFICATION AND OBJECT FIELD MEASURES								
Objective f in mm corresponds approxim- ately to the working distance	Eyepieces with tube f= 159 mm ⇒	Factor sign on magnification changer						Eyepieces with tube f = 125 mm ←
		0,4	0,63	1*	1,6	2,5	3,2	
		Total magnification / Field of view Ø in mm						
100	—	3,2 / 34,7	5,0 / 22,0	7,9 / 13,7	12,6 / 8,7	19,7 / 6,5	25,3 / 4,3	6,3 x
	6,3 x	4,0 / 28,1	6,3 / 17,9	10,0 / 11,3	16,0 / 7,0	25,0 / 4,5	32,0 / 3,5	—
	—	5,0 / 31,4	8,0 / 20,0	12,7 / 12,6	20,4 / 7,9	31,8 / 5,0	40,8 / 3,9	10 x
	10 x	6,4 / 23,6	10,0 / 17,0	15,9 / 10,8	25,5 / 6,6	39,8 / 3,8	51,0 / 2,9	12,5 x
	12,5 x	8,0 / 22,0	12,5 / 14,8	19,9 / 9,3	31,8 / 5,8	49,7 / 3,5	63,6 / 2,7	16 x
	16 x	10,2 / 18,8	16,0 / 12,0	25,5 / 7,5	40,8 / 4,7	63,6 / 3,0	81,4 / 2,3	20 x
150	20 x	12,8 / 14,2	20,0 / 9,0	31,8 / 5,6	51,0 / 3,6	80,0 / 2,3	102,4 / 1,8	—
	—	2,1 / 56,0	3,3 / 35,0	5,3 / 22,1	8,4 / 14,0	13,1 / 9,0	17,0 / 6,7	6,3 x
	6,3 x	2,6 / 42,0	4,2 / 28,2	6,7 / 18,0	10,6 / 11,1	16,7 / 7,2	21,4 / 5,3	—
	—	3,4 / 51,0	5,3 / 32,5	8,4 / 20,5	13,6 / 12,7	21,2 / 8,1	27,2 / 5,9	10 x
	10 x	4,2 / 40,0	6,7 / 26,1	10,6 / 16,4	16,9 / 10,2	26,5 / 6,5	33,9 / 4,4	12,5 x
	12,5 x	5,3 / 35,1	8,4 / 23,0	13,2 / 14,5	21,2 / 8,8	33,1 / 5,8	42,4 / 4,1	16 x
175	16 x	6,8 / 31,5	10,7 / 17,9	17,0 / 11,0	27,2 / 7,0	42,4 / 4,5	54,3 / 3,5	20 x
	20 x	8,5 / 26,0	13,4 / 16,9	21,2 / 10,8	34,0 / 6,5	53,0 / 4,1	67,8 / 2,7	—
	—	1,8 / 62,5	2,8 / 41,5	4,5 / 26,0	7,2 / 16,3	11,3 / 10,5	14,4 / 7,7	6,3 x
	6,3 x	2,3 / 47,0	3,6 / 32,5	5,7 / 16,3	9,2 / 13,0	14,3 / 8,6	18,2 / 6,2	—
	—	2,9 / 59,8	4,6 / 38,3	7,3 / 23,6	11,7 / 14,9	18,2 / 9,5	23,3 / 6,9	10 x
	10 x	3,7 / 45,0	5,7 / 29,5	9,1 / 18,6	14,5 / 11,5	22,8 / 7,6	29,2 / 5,1	12,5 x
200	12,5 x	4,6 / 40,3	7,2 / 26,5	11,4 / 16,6	18,2 / 10,2	28,4 / 6,7	36,4 / 4,8	16 x
	16 x	5,8 / 31,0	9,2 / 20,0	14,6 / 13,0	23,3 / 7,7	36,4 / 5,0	46,6 / 4,1	20 x
	20 x	7,3 / 30,0	11,5 / 19,0	18,2 / 12,0	29,2 / 7,5	45,5 / 4,7	58,2 / 3,1	—
	—	1,6 / 70,0	2,5 / 47,2	3,9 / 29,2	6,3 / 18,4	9,8 / 12,0	12,5 / 8,9	6,3 x
	6,3 x	2,0 / 58,0	3,2 / 36,0	5,0 / 23,0	8,1 / 15,0	12,6 / 10,0	16,0 / 7,1	—
	—	2,6 / 65,0	4,0 / 43,3	6,4 / 26,9	10,2 / 16,9	16,0 / 10,9	20,5 / 7,9	10 x
250	10 x	3,2 / 52,0	5,0 / 34,2	8,0 / 22,0	12,8 / 13,9	20,0 / 8,5	25,6 / 5,8	12,5 x
	12,5 x	4,0 / 47,0	6,3 / 31,3	10,0 / 19,7	16,0 / 12,2	25,0 / 7,8	32,0 / 5,5	16 x
	16 x	5,1 / 37,5	8,1 / 23,8	12,8 / 15,0	20,5 / 9,3	32,0 / 6,0	41,0 / 4,7	20 x
	20 x	6,4 / 34,0	10,0 / 22,0	16,0 / 13,7	25,6 / 8,7	40,0 / 5,4	51,2 / 3,5	—
	—	1,3 / 90,0	2,0 / 58,5	3,2 / 37,0	5,0 / 23,0	7,9 / 15,0	10,2 / 11,0	6,3 x
	6,3 x	1,6 / 71,2	2,5 / 47,0	4,0 / 28,7	6,5 / 18,0	10,0 / 12,0	12,8 / 8,9	—
275	—	2,1 / 85,0	3,2 / 54,0	5,1 / 33,5	8,2 / 21,0	12,8 / 13,2	16,4 / 9,8	10 x
	10 x	2,6 / 61,0	4,0 / 40,4	6,4 / 26,3	10,2 / 16,8	16,0 / 10,7	20,5 / 7,3	12,5 x
	12,5 x	3,2 / 56,0	5,0 / 37,4	8,0 / 23,5	12,8 / 14,8	20,0 / 9,4	25,6 / 6,8	16 x
	16 x	4,1 / 47,2	6,5 / 30,0	10,2 / 19,0	16,4 / 11,8	25,0 / 7,3	32,8 / 5,9	20 x
	20 x	5,1 / 42,5	8,1 / 27,3	12,8 / 17,0	20,5 / 10,5	32,0 / 7,0	41,0 / 4,3	—
	—	1,2 / 97,3	1,8 / 62,0	2,9 / 40,0	4,6 / 25,2	7,2 / 16,1	9,3 / 12,1	6,3 x
300	6,3 x	1,5 / 79,0	2,3 / 50,0	3,6 / 32,2	5,8 / 20,3	9,1 / 13,0	11,5 / 9,8	—
	—	1,9 / 90,0	2,9 / 60,0	4,6 / 37,0	7,4 / 23,0	11,5 / 14,9	14,7 / 10,8	10 x
	10 x	2,3 / 71,0	3,6 / 46,5	5,8 / 29,0	9,3 / 18,0	14,5 / 11,6	18,6 / 8,1	12,5 x
	12,5 x	2,9 / 62,1	4,6 / 41,1	7,2 / 25,8	11,6 / 16,0	18,0 / 10,2	23,0 / 7,6	16 x
	16 x	3,7 / 51,0	5,8 / 32,2	9,3 / 21,0	14,8 / 12,2	23,1 / 8,0	29,5 / 6,5	20 x
	20 x	4,6 / 44,5	7,3 / 29,2	11,6 / 18,9	18,5 / 12,0	29,0 / 7,5	37,1 / 4,8	—
400	—	1,0 / 105,0	1,7 / 68,5	2,6 / 43,5	4,2 / 27,3	6,6 / 17,5	8,3 / 13,4	6,3 x
	6,3 x	1,3 / 84,5	2,1 / 55,0	3,4 / 35,0	5,3 / 22,0	8,3 / 14,3	10,9 / 10,6	—
	—	1,7 / 93,0	2,7 / 63,0	4,2 / 40,0	6,8 / 25,0	10,6 / 16,0	13,6 / 11,8	10 x
	10 x	2,1 / 76,5	3,3 / 50,0	5,3 / 32,0	8,5 / 20,0	13,3 / 12,8	17,0 / 8,8	12,5 x
	12,5 x	2,7 / 68,8	4,2 / 44,8	6,6 / 28,1	10,6 / 17,4	16,6 / 11,0	21,2 / 9,0	16 x
	16 x	3,4 / 55,0	5,3 / 35,0	8,5 / 21,5	13,6 / 13,2	21,2 / 8,5	27,2 / 7,0	20 x
400	20 x	4,2 / 49,8	6,7 / 32,5	10,6 / 20,5	17,0 / 12,5	26,5 / 8,1	33,9 / 5,3	—
	—	0,8 / 137,0	1,2 / 85,0	2,0 / 56,0	3,2 / 36,0	4,9 / 23,0	6,4 / 18,6	6,3 x
	6,3 x	1,0 / 112,5	1,6 / 71,5	2,5 / 45,3	4,0 / 29,2	6,3 / 18,9	8,0 / 14,0	—
	—	1,3 / 126,0	2,0 / 82,5	3,2 / 52,5	5,1 / 33,0	8,0 / 21,2	10,2 / 15,7	10 x
	10 x	1,6 / 95,7	2,5 / 63,0	4,0 / 42,0	6,4 / 28,2	10,0 / 17,0	12,8 / 11,8	12,5 x
	12,5 x	2,0 / 91,0	3,2 / 59,0	5,0 / 37,4	8,0 / 23,1	12,5 / 14,8	16,0 / 11,0	16 x
400	16 x	2,6 / 76,0	4,0 / 47,0	6,0 / 28,3	10,2 / 17,5	16,0 / 11,5	20,5 / 9,4	20 x
	20 x	3,2 / 62,0	5,0 / 43,0	8,0 / 26,7	12,7 / 16,6	19,9 / 10,6	25,5 / 7,1	—

\* To read 1 if microscope used without magnification changer.

### 13.0 OBJECTIVE QUICK CHANGER (Fig.16)

- Screw in the complete objective quick changer (1) instead of a normal objective into the stereo microscope until stop.
- If the objective quick changer (1) is not in the position showed at the picture it is necessary to adjust it once.
- Loosen a little bit 3 threaded pins (2) with enclosed hexagon socket screw key, width across flats 1,5 mm.  
Bring the complete objective quick changer (1) into the showed (or in desired) position and tighten the 3 threaded pins (2) again.
- Lift up by hand the "objective in mount" (3) being in the optical axis of the microscope until stop (see arrow I) and bolt it with a little rotating move to the right (see arrow II).
- Quick changing: Unbolt the objective which is in working position by rotating to the left and pull it down. Bring the second objective (4) into the optical axis of the microscope by turning the lower part of the objective quick changer until it locks (180°). Lift up and bolt to the right.
- A non-reflecting image of object is only possible in this working position.



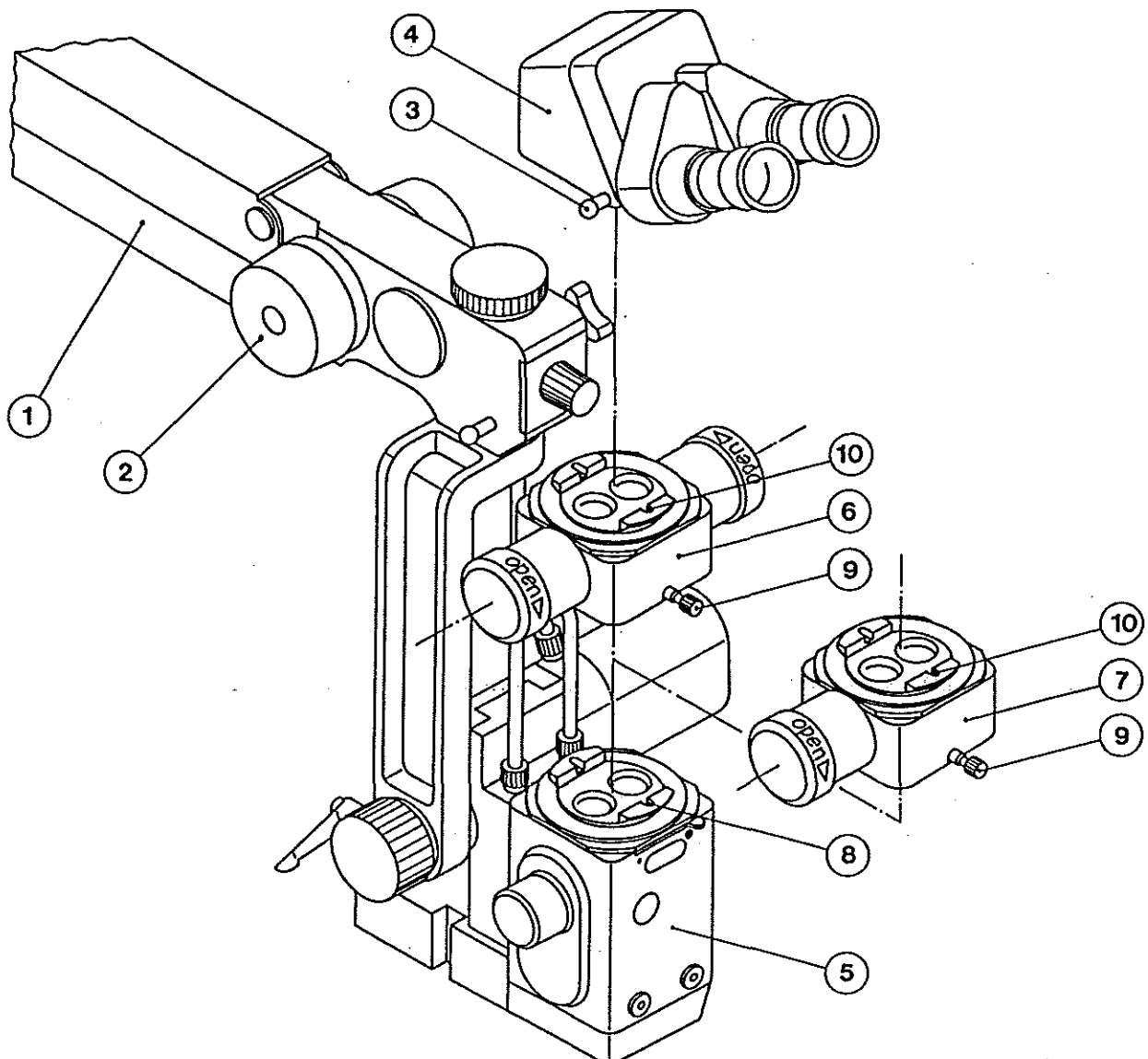
(Fig.16)

**14.0 COMPENSATION OF WEIGHT WHEN USING ACCESSORIES (Fig.17)**

- After supplementary accessories are mounted, the additional load of suspension arm (1) must be compensated by pulling off one or two counterweights (2).
- When dismantling put on counterweights at first. Then take off supplementary accessories.
- Before accessories will be removed, at first counterweights must be put on the arm so that it does not tip up.

**15.0 MOUNTING OF BEAM SPLITTER (Fig.17)**

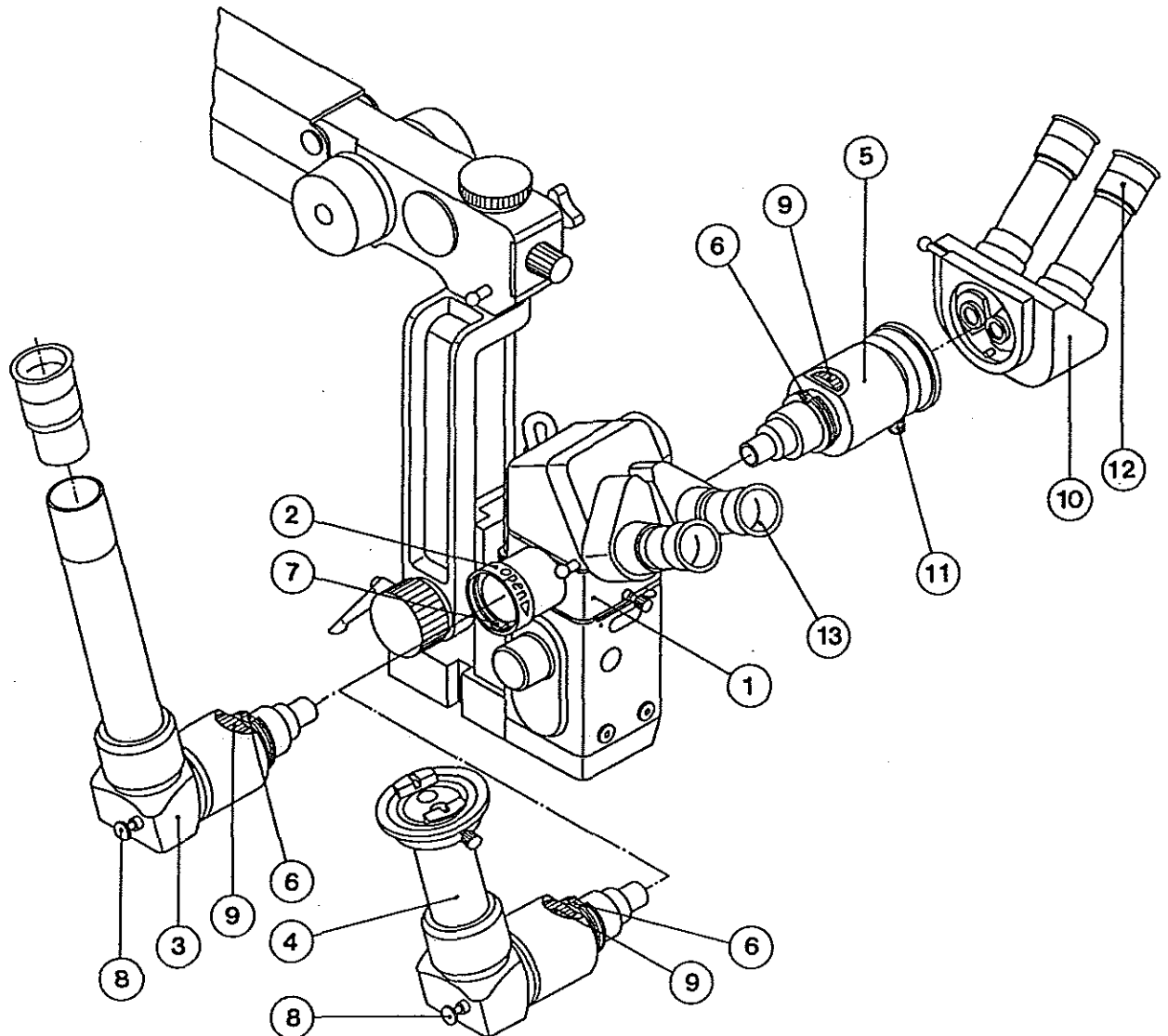
- Press pin with ball head (3), remove binocular tube (4) of magnification changer ZOOM motorized (5).
- When setting up beam splitter bilateral (6) or semilateral (7) the two lugs of beam splitter should lock into the nuts (8) of the magnification changer ZOOM motorized. Take care that beam splitter lays plane.
- Fasten beam splitter with knurled screw (9) by hand.
- When setting up tube - pin with ball head (3) must be pressed down - the two lugs of tube should lock into the nuts (10) of beam splitter. Take care that tube lays plane. Release the pin.



(Fig.17)

# 16.0 OBSERVATION TUBE MONOCULAR, OBSERVATION TUBE BINOCULAR AND ASSISTANCE TUBE 90° (Fig.18)

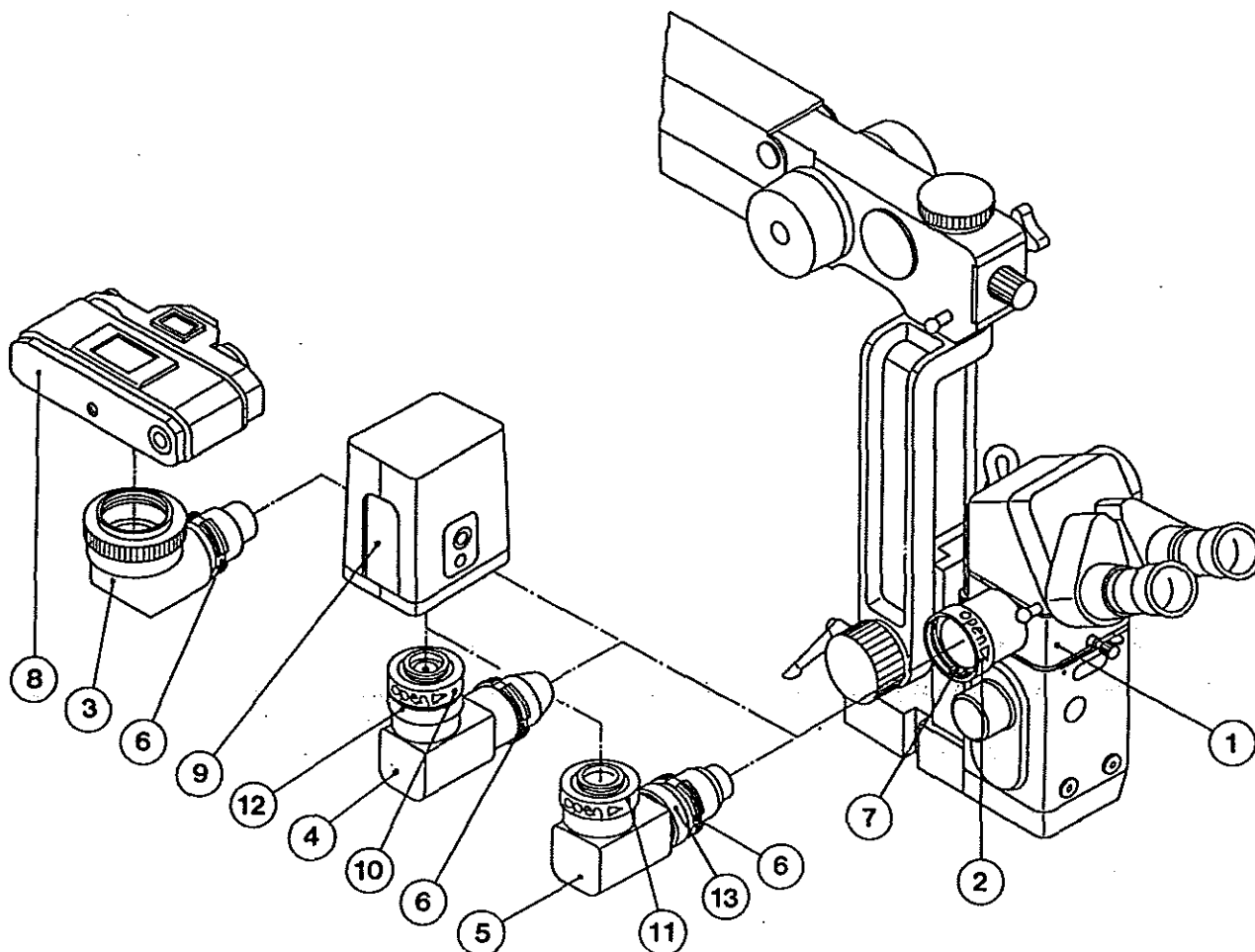
- Before adapting the tubes, remove cover from beam splitter (1) by turning the threaded ring (2) in direction "open".
- If tubes (observation tube monocular (3), observation tube binocular (4), assistance tube 90° (5)) will be inserted, take care that guide blades (7) hit grooves (6).
- After tube being inserted tighten threaded ring (2).
- Both superior parts of observation tubes (3) and (4) can be swivelled laterally by the observer. Hold superior pipe with one hand, press catch bolt (8) with ball of the thumb, move pipe in position as requested and set free catch bolt again.
- Image erection after swivelling for all tubes will be done by turning the knurled ring (9).
- Observation tube binocular (4) can be combined with straight or inclined tubes, if necessary. Assistance tube 90° mostly will be used with binocular tube 45° (10). For the observer these tubes can be brought in the most comfortable position by swivelling after loosening knurled screw (11). After finishing, fasten knurled screw again (image erection is necessary once more).
- Eyepieces (12) used with these accessories must have the same magnification factor as eyepieces (13) used with the microscope.



(Fig.18)

# 17.0 PHOTO TUBE WITH 35MM CAMERA, TV-TUBE WITH VIDEO CAMERA (CCD) (Fig.19)

- Before adapting the photo tube or TV-tube, remove cover from beam splitter (1) by turning the threaded ring (2) in direction "open".
- If tubes (photo tube (3), TV-tube  $f=54\text{mm}$  (4) or TV-tube  $f=80\text{mm}$  and  $f=145\text{mm}$  (5)) are inserted, take care that guide blades (7) hit grooves (6).
- To find the best working position user can insert tubes all  $90^\circ$ .
- After tube being inserted tighten threaded ring (2).
- Mount 35mm camera (8) on photo tube (3) (bayonet lock).
- Screw on to stop video camera (9) on TV-tube (4) or (5) (C-mount thread).
- Erect the inverted image:  
Turn threaded ring (10) or (11) in direction "open", turn video camera till image at screen has position of object.  
Tighten threaded ring (10) or (11) again.
- Diaphragm setting:  
If diaphragm will be closed more and more, the depth of field is growing. If illumination is powerfull enough, diaphragm can be used with smallest opening continuously.
- To open diaphragm of TV-tube  $f=54\text{mm}$  (4) move diaphragm ring (12) in the same direction as it is written on threaded ring (10).  
To open diaphragm of TV-tube  $f=80\text{mm}$  and  $f=145\text{mm}$  (5) move the diaphragm ring (13) in the same direction as it is written on the threaded ring (2) of beam splitter (1).



(Fig.19)

## 18.0 PHOTOGRAPHING WITHOUT FLASH in combination with KAPS stereo microscopes (photo equipment is already mounted, see 17.0)

- Use artificial light film (if possible), at least 400 ASA.
- It is helpful if camera shutter works automatically with changing brightness.
- For correct focussing it is absolutely necessary to change one of the normal eyepieces against one with the same magnification but built-in reticle (VS-type with double cross).
- This reticle is adjusted with great accuracy in the correct position where the intermediate image of the object appears. If the customer uses a correct adapter for the camera, the exposure plane of the film has the same optical distance. Now focus the double cross of the reticle by turning the eyepiece diopterring (observation with spectacle or without). The normal eyepieces diopter scale should be brought in the same position. Bring microscope illumination to maximum and open diaphragm of microscope. Start focussing your object with highest microscope magnification, after changing magnification the image will stay focussed.

The image in the camera will be focussed too.

Release photo camera by wire releaser (length appr. 30-50 cm) or by selftimer.

- Note:

If the customer uses camera with automatic shutter, it is very important for making perfect exposures to cover the eyepiece of the range finder against entering light, use black tape or similar. To get best results it is sometimes helpful to use additional exposure compensation (part of most modern cameras). In this case the automatic operating shutter speed can be caused by factors to move more or less quicker.

- He also can use normal shutter speed, 1/2 to 1/30 sec or shorter, he has to find out the best shutter speed when he is starting photographing with microscope the first time only (test exposures).

## 19.0 HOW TO GET A SHARP IMAGE ON THE TV SCREEN (Fig.20)

- Very important: The best results will be realized if one of the used eyepieces will be changed against one with a built-in cross hair reticle. Start with focussing the cross hair in the eyepiece by turning the diopter ring. Adjust biggest factor at magnification changer. Approach microscope of the object until it is focussed, you now see a sharp image in the microscope.
- If TV camera was delivered by KAPS Company, the camera is adjusted and the screen now shows a sharp image too. If a not adjusted system is used, the chip in the camera must be moved a little bit (see camera manual) till you get a sharp image. If you are not successful, maybe a distance ring between camera and TV-tube is necessary.
- If all is well adjusted as described before, you see a sharp image in the microscope and at the screen even though magnification will be changed.
- If TV system is not delivered by KAPS Company, maybe it is necessary to correct image sharpness on the screen although the object in the microscope is well focussed.
- Correction 1:  
The chip position in the TV camera must be changed (without moving the microscope). Most TV cameras have a possibility of adjustment (see camera manual).

• **Correction 2:**

If correction 1 is not possible, the whole TV camera on TV-tube must be moved:

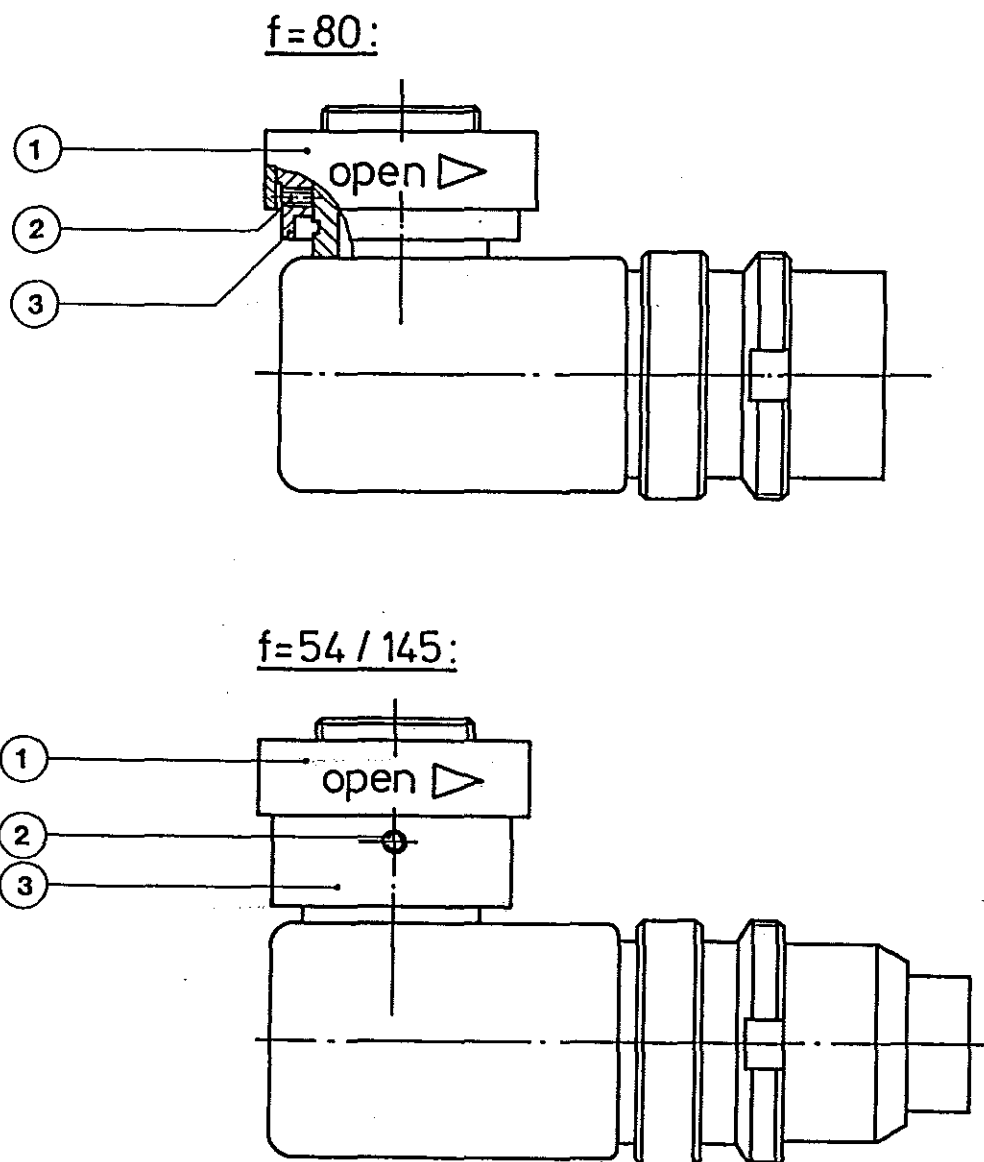
TV-tube  $f=80\text{mm}$ :

Open diaphragm, reduce illumination if necessary. Mount TV camera (upright position), loosen threaded ring (1) so that the 3 threaded pins (2) become visible, loosen threaded pins (use hexagon socket wrench 1,5mm) by turning around 1/2 rotation each, turn around threaded ring (3) up or down till a sharp image on screen appears, tighten threaded pins (2) again, turn TV camera till image on screen has position of object. Tighten threaded ring (1) again.

TV-tube  $f=54\text{mm}$  and  $f=145\text{mm}$ :

The threaded pins (2) are visible without moving threaded ring (1). Procedure is the same as described for TV-tube  $f=80\text{mm}$ .

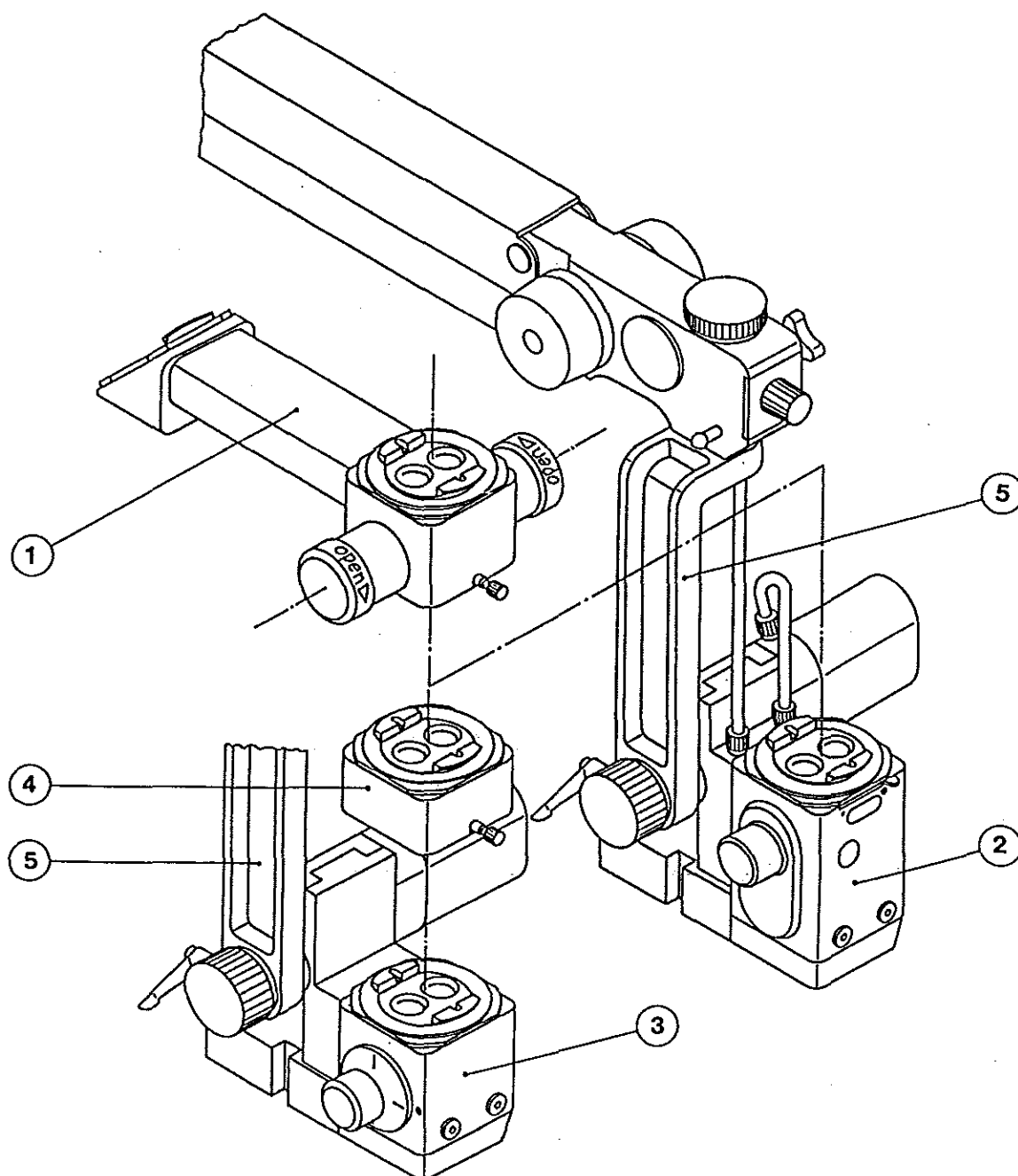
For erecting the inverted image, loosen threaded ring (1), turn around TV camera till image on screen has position of object, tighten threaded ring again.



(Fig.20)

**20.0 ASSISTANCE AND OBSERVATION SETTING 180° (Fig.21)**

- The mounting of assistance and observation setting 180° (1) is made in the same way as the mounting of beam splitter, see 15.0.
- Adaption with ZOOM magnification unit is made directly. The adapter h=38mm (2) is necessary in combination with magnification unit 3fold and 5fold.
- The mounting of adapter h=38mm is made as the mounting of beam splitter, see 15.0.
- To use all these accessories it is necessary that the axle of objective is brought in vertical position (3). If there a centering and inclinable coupling 0-90° is in use, the angle must be changed to 0° (objective is looking to the table). A possibly used 45° coupling must be taken off.
- At the inclined side of assistance and observation setting 180° preferably a binocular straight tube is to be used, at the side of the microscope a binocular inclined tube 60°.



(Fig.21)

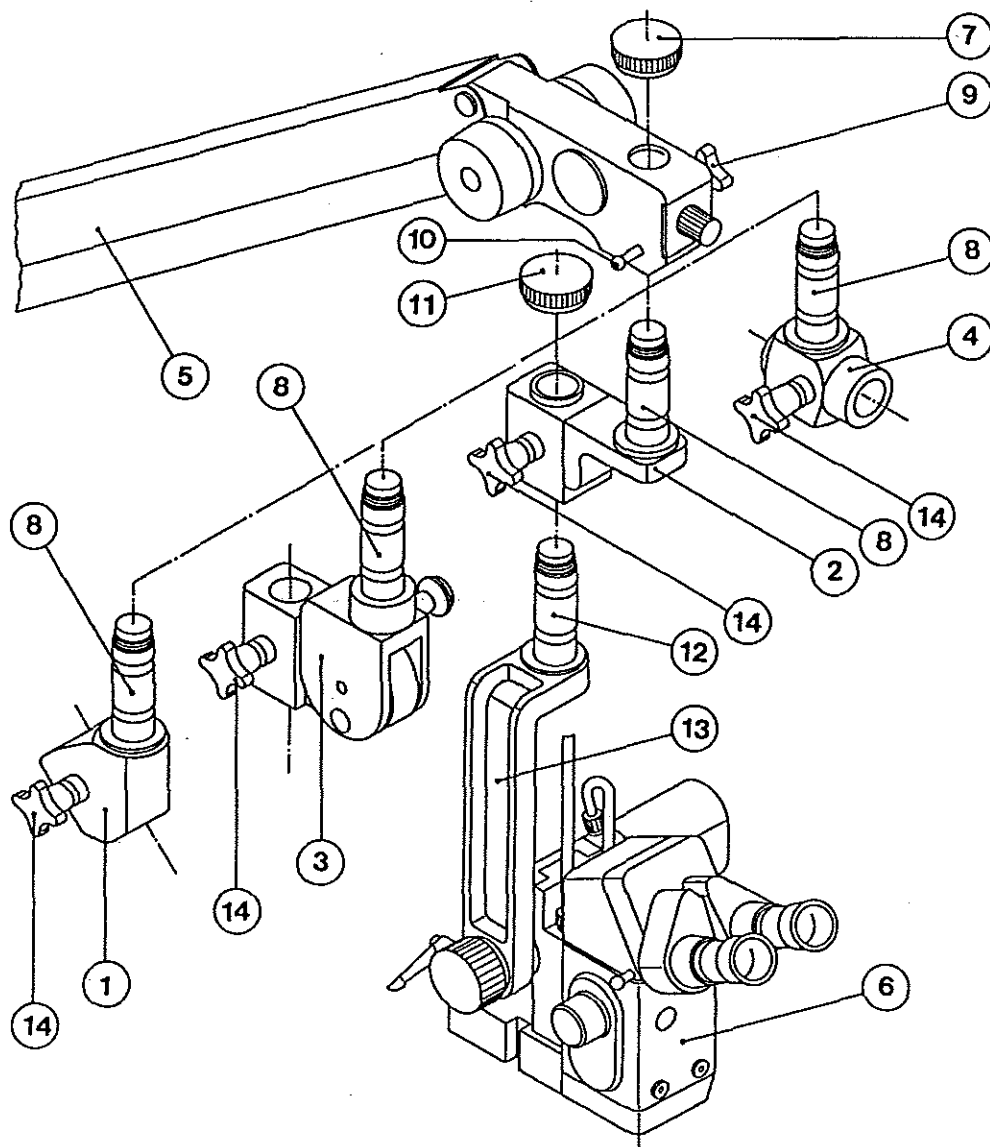


**21.0 MOUNTING AND OPERATION OF COUPLINGS (Fig.22)**

- (1) 45° coupling
- (2) centering coupling
- (3) centering and inclinable coupling 0-90°
- (4) 90° coupling

These 4 versions of couplings will be mounted in the same way at the suspension arm (5).

- Draw out microscope head (6) (dismantling of microscope head in reverse order as described at 4.0).
- Insert one of the couplings (1), (2), (3) or (4). For that purpose unscrew safety cap (7) from guide cylinder (8) of the respective coupling. Take care that clamp, cross handle (9) is open. Press locking pin (10) and insert guide cylinder of coupling to its stop. Release locking pin; it locks and thus prevents the drop out of coupling. Screw on safety cap (7) on overlying thread of guide cylinder by hand again.
- Insert microscope head (6). For that purpose unscrew safety cap (11) from guide cylinder (12) of microscope carrier (13). Take care that clamp, cross handle (14), is open. Press locking pin at coupling and insert guide cylinder of microscope carrier to its stop. Release locking pin; it locks and thus prevents the drop out of microscope head. Screw on safety cap (11) on overlying thread of guide cylinder by hand again.

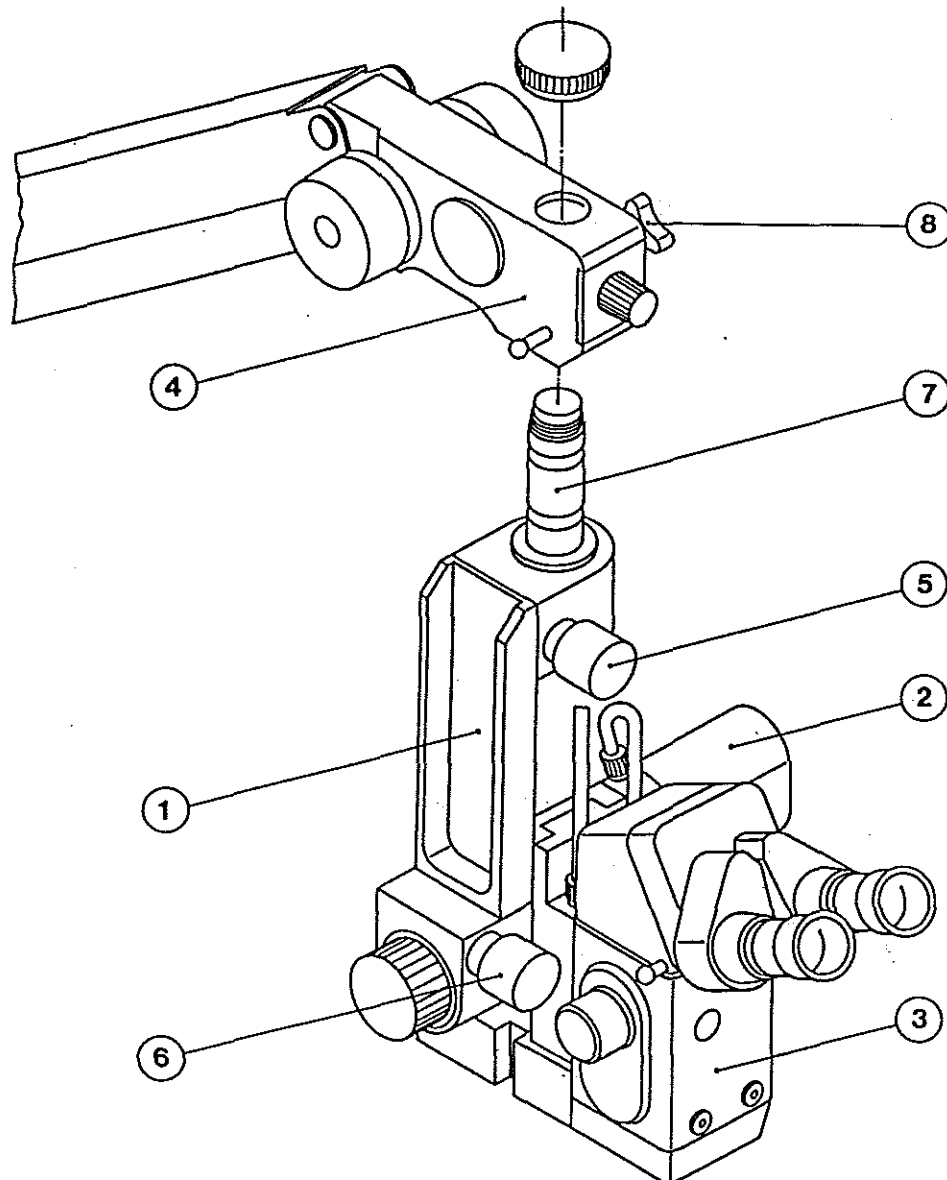


(Fig.22)

- **Operation:** The different couplings are necessary for positioning of different angles of the microscope carrier.  
In case of 45° coupling (1) the microscope carrier is placed with an angle of 45° in the coupling. The position of microscope carrier in case of 90° coupling (4) is parallel to the table. The centering and inclinable coupling 0-90° (3) offers the adjustment from 0° to 90°, by steps every 15°. The centering coupling (2) allows to adjust the microscope so that the sighted center is not going out of range, if rotating (depends on foregoing adjustment). This function also is realized by the centering and inclinable coupling 0-90° (3).

## 22.0 MICROSCOPE CARRIER (2 GEARS) (Fig.23)

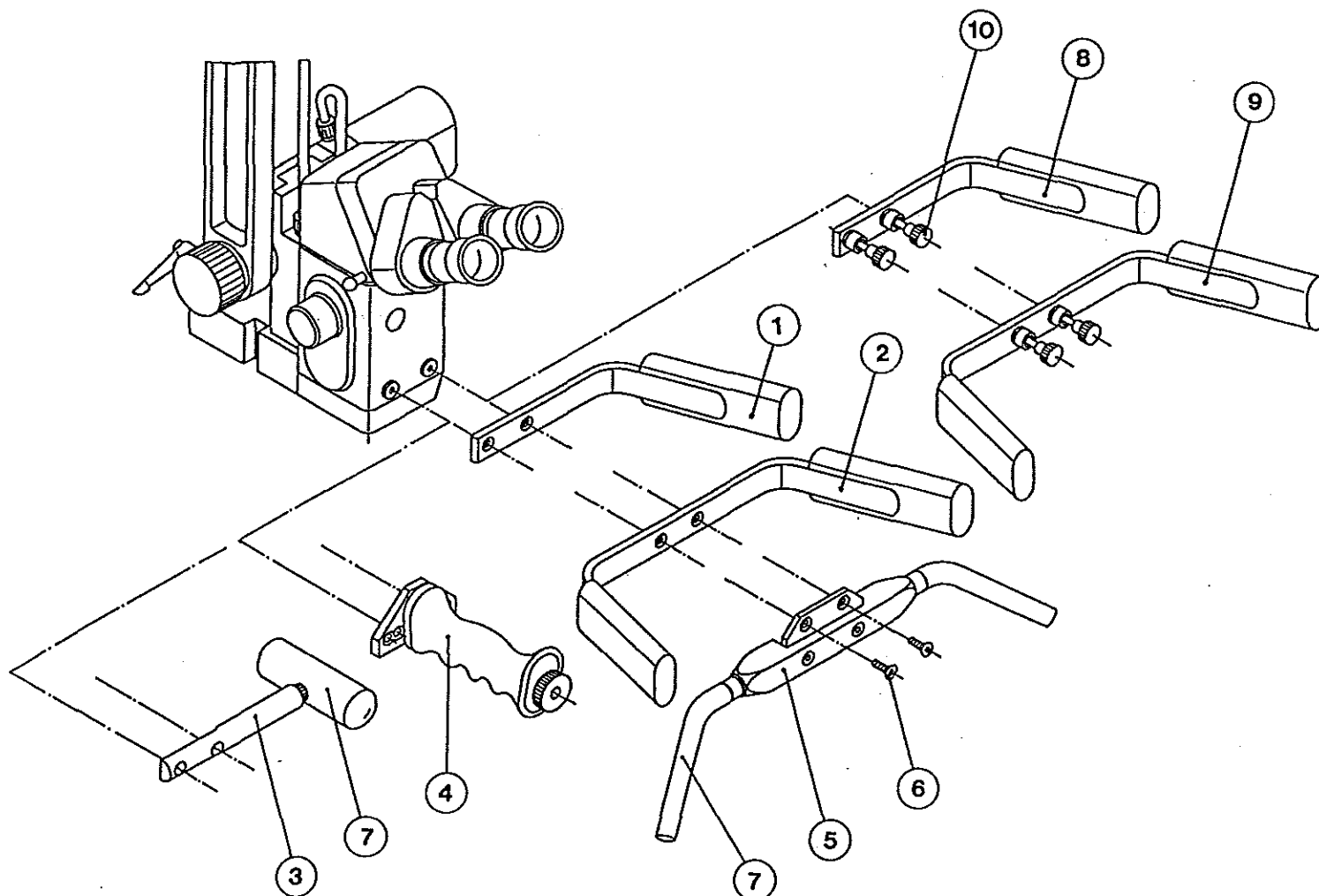
- The microscope carrier (2 gears) (1) is only available in connection with fine focussing (2).
- This version of microscope carrier must be ordered together with the microscope (retrofit only in KAPS Company).
- The insertion of microscope head (3) into the suspension arm (4) is made as described at 4.0, page 5.
- To adjust the microscope precisely around the vertical axle, rotate knob (5), around the horizontal axle, rotate knob (6). Before using knob (5) the guide cylinder (7) must be clamped (8).



(Fig.23)

### 23.0 HANDLES AND MICROSCOPE GUIDES (Fig.24)

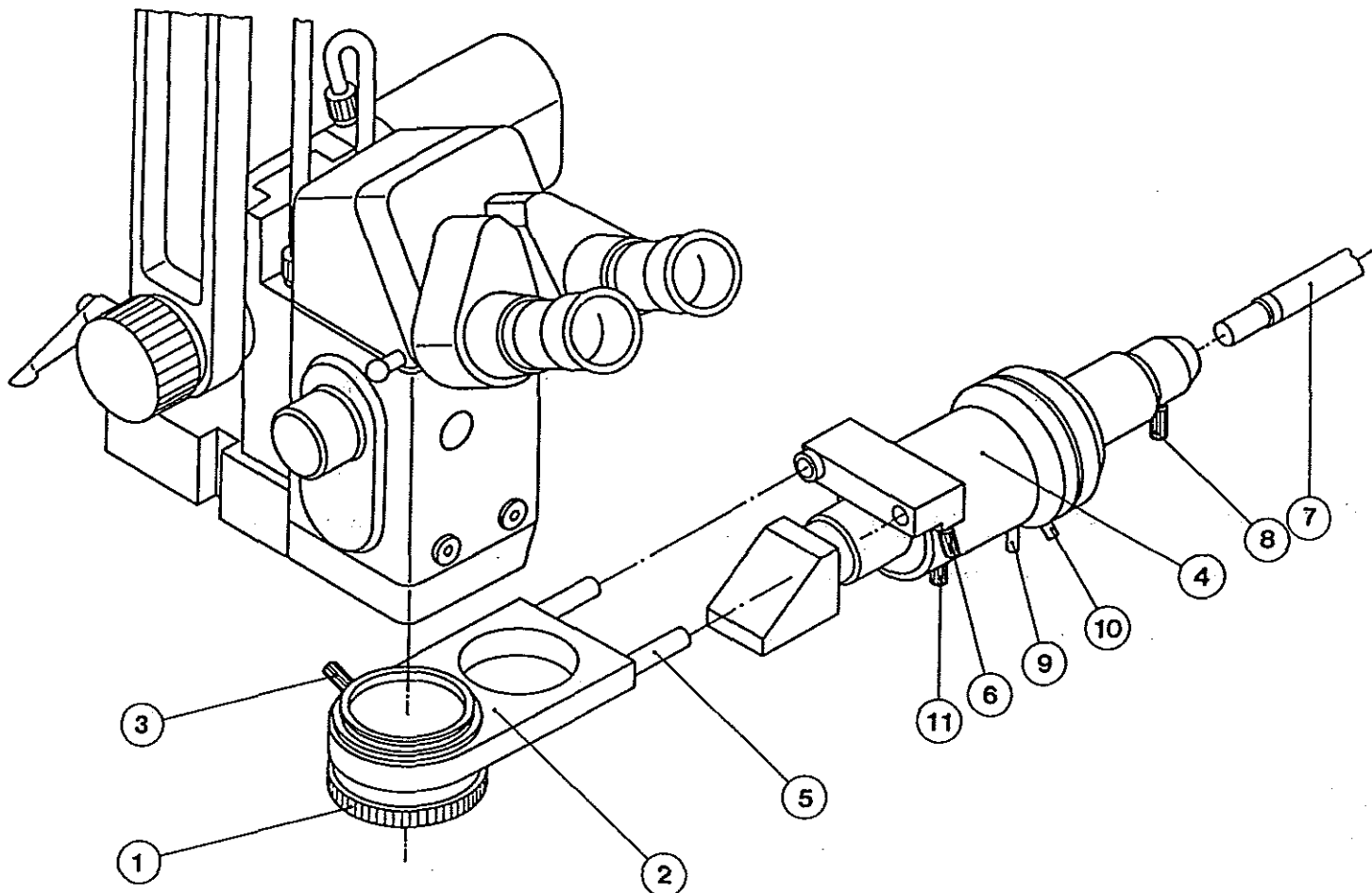
- |                      |                       |
|----------------------|-----------------------|
| (1) handle           | order no. 102.186-000 |
| (2) microscope guide | order no. 102.188-000 |
| (3) T-handle         | order no. 162.860-000 |
| (4) handle           | order no. 102.184-000 |
| (5) microscope guide | order no. 102.182-000 |
- The adaption of these handles or guides at the microscope head is made all in the same way.
  - Fasten handle or microscope guide with 2 screws (6) with hexagon socket wrench (2,5mm).
  - The T-handle (4) and microscope guide (5) has adjustable handles (7); for adjusting draw out laterally. After bringing handles in desired position, they will be engaged automatically after setting free.
- |                                    |                       |
|------------------------------------|-----------------------|
| (8) handle, sterilizable           | order no. 102.186-100 |
| (9) microscope guide, sterilizable | order no. 102.188-100 |
- Fasten handle or microscope guide with 2 knurled screws (10) at the microscope head.
  - Take off handle or microscope guide for sterilization, both knurled screws cannot be lost.



(Fig.24)

**24.0 MOUNTING AND USING THE SLIT LAMP (Fig.25)**

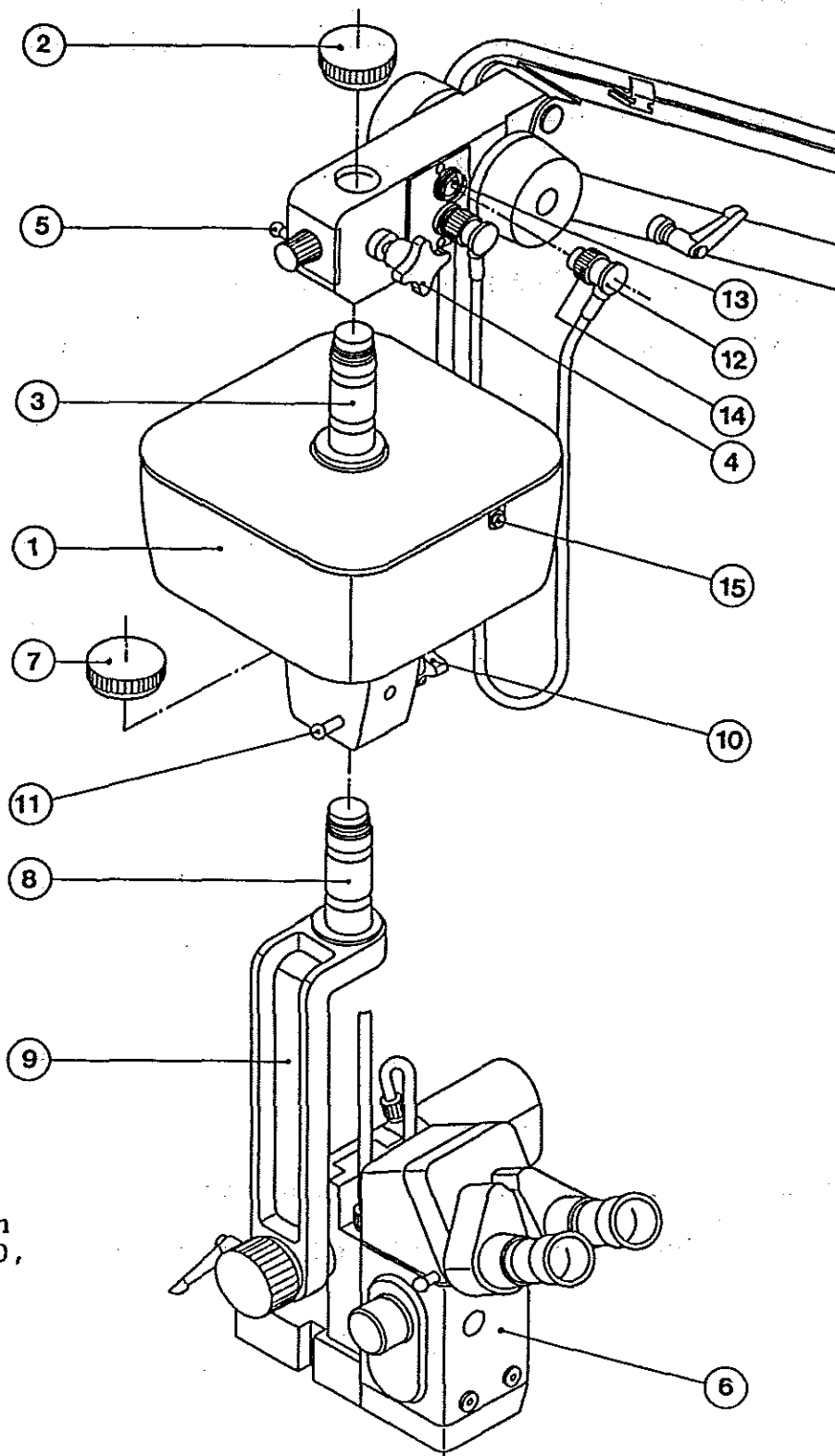
- **Mounting:** Holding device for slit lamp (2) is fixed on microscope objective (1) in special mount. Instead of a normal objective screw in this objective mount in the microscope.
- The holding device for slit lamp (2) is rotating around the lens axis. Rotating can be arrested with clamping screw (3).
- The holding device is fitted with two guide pins (5) wherein the slit lamp (4) has been to insert till stop. Arrest with clamping screw (6).
- The second fibre optic light guide (7) will be inserted till stop in the slit lamp with plane side (light exit shows no fibre structures). Arrest with knurled screw (8). The other end of fibre optic light guide (light exit shows fibre structures) with mounted adapter (see 4.0, page 5) will be inserted in the lamp insert at the side of spare lamp.
- The fibre optic light guide will be guided in cable holder movable. Pay attention that the rotating move of the slit lamp around the objective will not be hindered by fibre optic light guide.
- **Setting in motion:** By pressing change-over switch lamp I/lamp II (see 7.2, page 11) by switched on appliance, microscope or slit illumination can be choosen.
- Slit width to operate steplessly with lever (9) from 0 to full opening. The possible rotation of the slit with lever (10) around the optical axle of slit lamp should be arrested with clamping screw (11).
- By not using the slit lamp it can be removed very easily. By inserting to holding device the fixed adjustment position will always be exactly obtained.



(Fig.25)

## 25.0 MOUNTING AND USING THE XY-COUPLING (Fig.26)

- The XY-coupling (1) must be ordered together with the microscope (retrofit only in KAPS Company).
- Unscrew safety cap (2) from guide cylinder (3) of XY-coupling (1). Take care that clamp, cross handle (4), is open.
- Press locking pin (5) and insert guide cylinder of XY-coupling to its stop. Release locking pin; it locks and thus prevents the drop out of XY-coupling.
- Screw on safety cap (2) on overlying thread of guide cylinder by hand again.
- Insert microscope head (6). For that purpose unscrew safety cap (7) from guide cylinder (8) of microscope carrier (9). Take care that clamp, cross handle (10), is open. Press locking pin (11) at XY-coupling and insert guide cylinder of microscope carrier to its stop. Release locking pin; it locks and thus prevents the drop out of microscope head. Screw on safety cap (7) on overlying thread of guide cylinder by hand again.
- Connect plug (12) from XY-coupling (1) with plug socket (13) and secure with knurled ring (14). Attention: The nose of the plug must fit to the groove of plug socket.
- The XY-coupling allows the motorized displacement of the microscope head in X- and Y-direction (54mm). Operation by foot switch panel (see page 9 and 10, 6.0 Control elements, Fig.6 (26) and (27)).
- When switching on the appliance the XY-coupling goes to the center automatically. Autocentering of XY-coupling from every position by touching the button (15).



(Fig.26)

**26.0 ACCESSORIES (Survey with Order No.)**

Order No.

101.310-000	BEAM SPLITTER, bilateral	(6) Fig.17, page 19
101.315-000	BEAM SPLITTER, semilateral	(7) Fig.17, page 19
162.670-100	ASSISTANCE AND OBSERVATION SETTING 180°	(1) Fig.21, page 24
101.295-000	ADAPTER h=38mm	(2) Fig.21, page 24
101.320-000	PHOTOTUBE	(3) Fig.19, page 21
101.330-000	OBSERVATION TUBE MONOCULAR	(3) Fig.18, page 20
101.360-100	OBSERVATION TUBE BINOCULAR	(4) Fig.18, page 20
101.328-000	CAMERA HOUSING	(8) Fig.19, page 21
162.290-200	FINE FOCUSING f. ZOOM MOTORIZED	(2) Fig.23, page 26
102.187-000	45° COUPLING	(1) Fig.22, page 25
102.189-000	CENTERING COUPLING	(2) Fig.22, page 25
102.170-000	CENTERING AND INCLINABLE COUPLING 0-90°	(3) Fig.22, page 25
108.120-000	90° COUPLING	(4) Fig.22, page 25
112.370-000	MICROSCOPE CARRIER (2 gears) (retrofit only in KAPS Company)	(1) Fig.23, page 26
101.945-000	BINOCULAR STRAIGHT TUBE f=125mm	(4) Fig.14, page 16
101.355-000	BINOCULAR STRAIGHT TUBE f=159mm	
101.930-000	BINOCULAR INCLINED TUBE 45° f=125mm	(2) Fig.14, page 16
101.110-000	BINOCULAR INCLINED TUBE 45° f=159mm	
101.955-000	BINOCULAR INCLINED TUBE 60° f=159mm	(3) Fig.14, page 16
101.950-000	BINO. INCLINABLE TUBE 0-60° f=159mm	(5) Fig.14, page 16
101.970-000	ASSISTANCE TUBE 90°	(5) Fig.18, page 20
101.800-000	TV-TUBE WITH DIAPHRAGM f=145mm	(5) Fig.19, page 21
101.850-000	TV-TUBE WITH DIAPHRAGM f= 80mm	(5) Fig.19, page 21
101.860-000	TV-TUBE WITH DIAPHRAGM f= 54mm	(4) Fig.19, page 21
	VIDEO CAMERA C-mount connection	(9) Fig.19, page 21
101.410-000	EYEPIECE WITH RETICLE WF 6,3xVS	(2) Fig.15, page 16
101.430-000	EYEPIECE WITH RETICLE WF 10 xVS	
101.440-000	EYEPIECE WITH RETICLE WF 12,5xVS	
101.450-000	EYEPIECE WITH RETICLE WF 16 xVS	
101.460-000	EYEPIECE WITH RETICLE WF 20 xVS	
101.510-000	EYEPIECE WF 6,3xV	
101.530-000	EYEPIECE WF 10 xV	
101.540-000	EYEPIECE WF 12,5xV	
101.550-000	EYEPIECE WF 16 xV	
101.560-000	EYEPIECE WF 20 xV	
101.610-000	OBJECTIVE f=100mm	(1) Fig.15, page 16
101.620-000	OBJECTIVE f=150mm	
101.680-000	OBJECTIVE f=175mm	
101.630-000	OBJECTIVE f=200mm	
101.640-000	OBJECTIVE f=250mm	
101.650-000	OBJECTIVE f=275mm	
101.660-000	OBJECTIVE f=300mm	
101.670-000	OBJECTIVE f=400mm	
102.181-000	OBJECTIVE QUICK CHANGER (for magnification unit 3fold)	(1) Fig.16, page 18
102.191-000	OBJECTIVE QUICK CHANGER (for magnification unit 5fold, ZOOM)	
101.900-000	SLIT LAMP 15° f=175mm	(4) Fig.25, page 28
101.910-000	SLIT LAMP 15° f=200mm	
102.186-000	HANDLE	(1) Fig.24, page 27
102.186-100	HANDLE, STERILIZABLE	(8) Fig.24, page 27
102.188-000	MICROSCOPE GUIDE	(2) Fig.24, page 27
102.188-100	MICROSCOPE GUIDE, STERILIZABLE	(9) Fig.24, page 27
162.860-000	T-HANDLE	(3) Fig.24, page 27
102.184-000	HANDLE	(4) Fig.24, page 27
102.182-000	MICROSCOPE GUIDE	(5) Fig.24, page 27
112.580-100	XY-COUPLING (retrofit only in KAPS Company)	(1) Fig.26, page 29

ADDITIONAL ACCESSORIES ARE AVAILABLE ON REQUEST, SEE PRICE LIST

## 27.0 DESINFECTION AND STERILIZATION (Fig.27)

- For diagnosis:

Moisten smooth cotton cloth with antiseptic fluid (for example Sagrotan-P). When required clean often touched parts, like rotating knobs, handles and so on.

There are also rubber sterilization caps for the rotating knobs of fine focussing (1), magnification unit (2) and brightness control (3) on offer.

Sterilization caps:

(4) order no. 101.733-000

(5) order no. 101.732-000

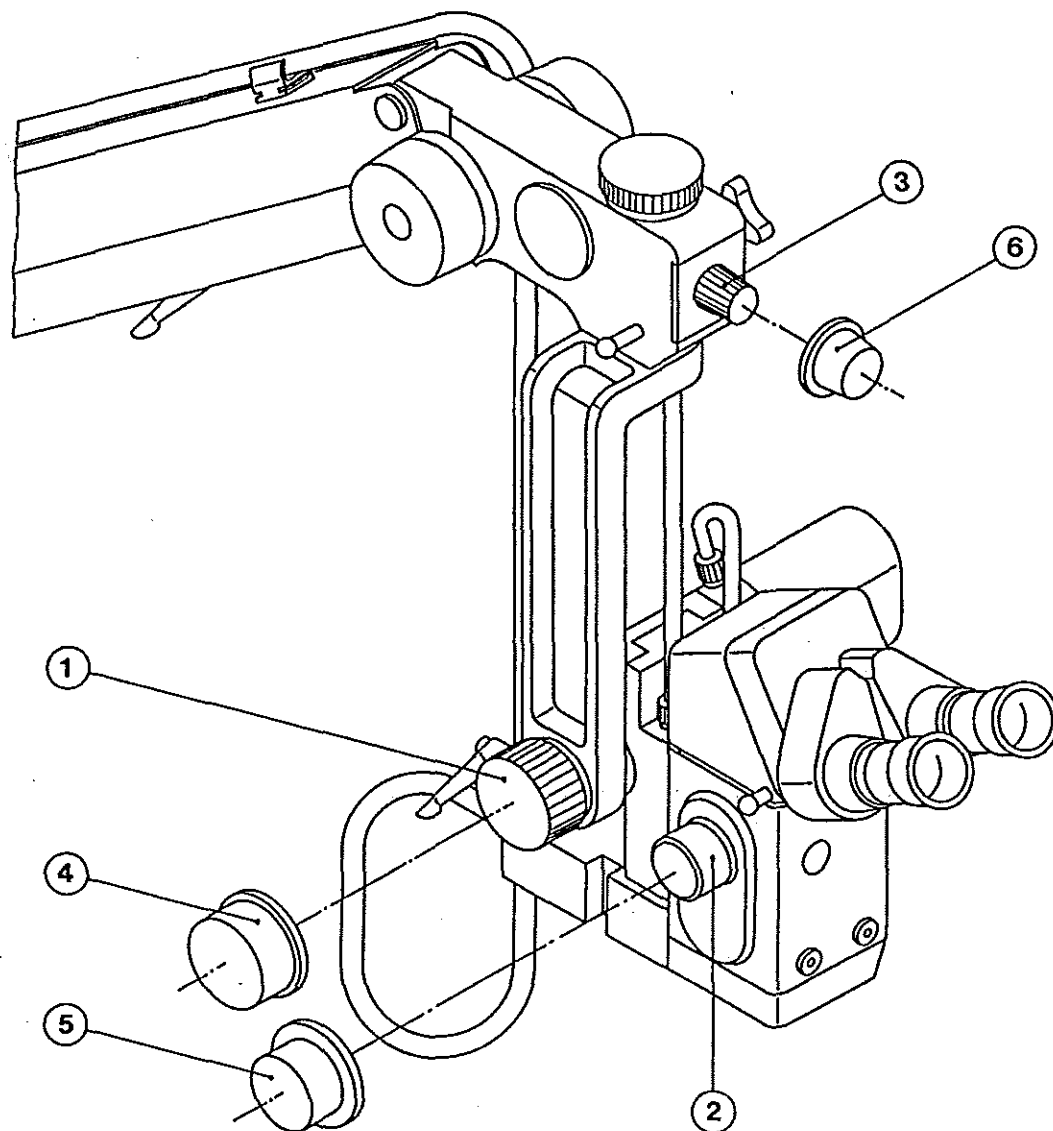
(6) order no. 101.731-000

The handle 102.186-100 and the microscope guide 102.188-100 (see 23.0 Handles and microscope guides (Fig.24), page 27) are also sterilizable by heat (Autoklav).

- Use in surgery:

Very popular are sterilized plastic covers for one time use, prepared for accessories and openings for eyepieces and objective.

Instead of this covers from plastic, texture covers for several times sterilization are in use, too.



(Fig.27)

## 28.0 CLEANING AND SERVICE

- How to clean optical surfaces:  
Remove coarse dirt particle with a clean dry hair penell from optical outer surfaces (objective, eyepiece - eye lens). Before this, clean the penell in pure alcohol or ether and let it dry.  
Then moisten smooth cotton cloth with pure alcohol and wipe in a circle from the middle of the lens outside. With dry cotton cloth polish the breathed lens. (You can also use cleaning kits which are suitable for spectacles.)  
The antireflex coatings are very resistant as they are not evaporated. If you clean as above described, the coatings will not be damaged.
- How to clean lacquered parts:  
Moisten clean smooth cotton cloth with water including a few drops of liquid soap and wipe over the dirty parts. For remaining spots moisten the cloth with pure alcohol or gasoline for cleaning and wipe carefully.
- Service: Service as required, inform after - sales service.

## 29.0 TECHNICAL DATA

model:	SOM 62 COLD LIGHT MOTORIZED, order no. 162-400-200
measures:	see page 6
mains supply:	115 V / 230 V, to switch over
variation of mains voltage:	max. + / - 10 %
mains frequency:	50 / 60 Hz
type of connection:	single - phase, shrouded contact plug
mains protection by fuses:	2x T 1 A with 115 V / 230 V
power input:	max. 150 VA
type of protection against electrical shock:	1, protective earth conductor
mode of operation:	continuous operation
ambient temperature:	10° C to 40° C
relative humidity:	max. 75 %
weight:	appr. 100 kg
xenon reflector lamp:	15 V / 150 W, KAPS ident no. 700-509
mains control:	+ / - 1 %
lamp:	
brightness range:	30 to 100 % lamp performance
temperature limitation:	protecting system by reducing lamp performance

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

### 29.1 DECLARATION OF CONFORMITY WITH EU RULES

This appliance is manufactured in accordance with the specifications of the following European directions:

93 / 42 / EWG	Products of medicine
89 / 336 / EWG, 92 / 31 / EWG	Emission of electromagnetic disturbances and immunity against electromagnetic disturbances
73 / 23 / EWG	Electrical production facilities for use within defined voltage ranges

For judgement the following harmonized standards are used:

DIN EN 60601 - 1 (VDE 0750 part 1): 1996 - 03 EN 60601 - 1: 1990 + A1: 1993 +  
A2: 1995  
IEC 601 - 1: 1988 - 12  
IEC 601 - 1 / A1: 1991 - 11  
IEC 601 - 1 / A2: 1995 - 03  
Transport and storage: a), b) and c) as in EN 60601 - 1